SEP 9 1981

982-B

ITC 1.11:4-2-6

SUMMARY OF TRADE AND TARIFF INFORMATION

COMPLETED
81

Prepared in Terms of the Tariff Schedules of the United States

SALT AND SODIUM ALKALIES

TSUS Items 420.72,-.84,-.86,-.92, -.94,-.96, 421.08

ORIGINAL

USITC PUBLICATION 841
CONTROL NO. 4-2-6
MAY 1981

United States International Trade Commission / Washington, D.C. 20436

UNITED STATES INTERNATIONAL TRADE COMMISSION

COMMISSIONERS

Bill Alberger, Chairman

Michael J. Calhoun, Vice Chairman

Catherine Bedell

Paula Stern

Kenneth R. Mason, Secretary to the Commission

This report was prepared by
Alfred R. Mangino

Organic and Inorganic Chemicals Branch
Energy and Chemicals Division

Office of Industries
Norris A. Lynch, Director

Address all communications to
Office of the Secretary
United States International Trade Commission
Washington, D.C. 20436

FOREWORD

Each Summary of Trade and Tariff Information is part of a series published by the United States International Trade Commission to provide information on conditions of competition between domestic and foreign products. This report, generally covering the period 1975 through 1979, is one of many being published in the current series of summaries.

This series provides comprehensive coverage of product uses, the domestic industry, U.S. consumption, production, and trade, and the domestic and international markets in each commodity area. The summaries are cast in terms of the eight schedules of the Tariff Schedules of the United States (TSUS).

The current series will consist of approximately 600 individual reports. The Commission will issue updated statistical tables and industry status reports as appropriate for individual summaries. The overall program will run several years, ultimately covering all items of the TSUS.

BEST DOCUMENT AVAILABLE

BLANK PAGE

CONTENTS

	Page
Foreword	i
Executive summary	vii
Description and uses	1
Sodium chloride (NaCl)	1
Sodium hydroxide (NaOH)	2
Sodium carbonate (Na_2CO_3)	3
Sodium bicarbonate ($NaHCO_3$)	3
Customs treatment:	
U.S. customs treatment	3
Foreign customs treatment	7
U.S. industry	9
Basic data and information	9
Financial information	10
The U.S. market:	
Domestic market profile:	
Sodium chloride	11
Sodium hydroxide	12
Sodium carbonate	13
Sodium bicarbonate	13
U.S. consumption:	
Sodium chloride	14
Sodium hydroxide	15
Sodium carbonate	15
Sodium bicarbonate	16
U.S. production:	
Sodium chloride	17
Sodium hydroxide	18
Sodium carbonate	20
Sodium bicarbonate	21
U.S. imports:	
Sodium chloride	22
Sodium hydroxide	22
Sodium carbonate	23
Sodium bicarbonate	23
The international market:	
International market profile:	
Sodium chloride	23
Sodium hydroxide	26
Sodium carbonate	27
U.S. exports:	
Sodium chloride	29
Sodium hydroxide	29
Sodium carbonate	29
Sodium bicarbonate	30
Appendix A. Part 2, subpart C, schedule 4, of the Tariff Schedules of the United States Annotated (1981) and staged rates of duty	31
Appendix B. Concordance of TSUS numbers, Schedule B numbers, SIC numbers, SITC numbers, and CCCN numbers	35
Appendix C. Flow chart of reaction products and uses for sodium hydroxide	37
Appendix D. Statistical tables	41

BEST DOCUMENT AVAILABLE

CONTENTS

Page

Figure

U.S. production of sodium carbonate---------- 20

Tables

Table 1.--Sodium chloride: Production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-79, January-October 1979, and January-October 1980---------- 42
Table 2.--Sodium chloride (liquid and anhydrous): U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-1979, and January-October 1979, and January-October 1980---------- 43
Table 3.--Sodium carbonate: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-1979, January-October 1979, and January-October 1980---------- 44
Table 4.--Sodium bicarbonate: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-79, January-October 1979, and January-October 1980---------- 45
Table 5.--Sodium chloride (salt): in brine: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980---------- 46
Table 6.--Sodium chloride (salt): in bulk: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980---------- 47
Table 7.--Sodium chloride (salt): other: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980---------- 48
Table 8.--Sodium hydroxide: liquid and anhydrous: U.S. imports for consumpton, by principal sources, 1975-79 and January-October 1979, and January-October 1980---------- 49
Table 9.--Sodium carbonate: calcined (soda ash): U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980---------- 50
Table 10.--Sodium carbonate: hydrated and sesquicarbonate: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980---------- 51
Table 11.--Sodium bicarbonate: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980----- 52
Table 12.--Sodium chloride (salt): in brine: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980---------- 53

BEST DOCUMENT AVAILABLE

CONTENTS

Page

Tables

Table 13.--Sodium hydroxide: liquid: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980---------- 54
Table 14.--Sodium hydroxide: anhydrous: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980---------- 55
Table 15.--Sodium carbonate: calcined (soda ash): U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980---------- 56
Table 16.--Sodium bicarbonate: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980---------- 57

BEST DOCUMENT AVAILABLE

BLANK PAGE

Executive Summary

This summary covers sodium chloride (salt), sodium hydroxide (caustic soda), sodium carbonate (soda ash), and sodium bicarbonate (baking soda) as provided for by items 420.92-.96, 421.08, 420.84-.86, and 420.72 of the Tariff Schedules of the United States (TSUS).

Sodium chloride.--Sodium chloride is found in great abundance throughout the world. Practically speaking, worldwide resources are unlimited. The principal use of sodium chloride is for the production of the so-called chlor-alkalies, namely chlorine, sodium hydroxide, and sodium carbonate. World production of sodium chloride in 1979 was estimated at nearly 185 million short tons. The United States accounted for 25 percent of the world's production, producing more than 46 million short tons. China, the U.S.S.R., and West Germany collectively account for another 28 percent.

In the United States, there are two distinct groups of firms that produce sodium chloride. One group produces primarily sodium chloride in brine for captive use for the manufacture of the chlor-alkalies; the other produces primarily rock and evaporated sodium chloride for noncaptive industrial and personal uses.

U.S. imports of sodium chloride, principally from Canada, Mexico, and the Bahamas, amounted to about 11 percent of consumption. In 1979, U.S. exports were 4.5 percent of production, and went primarily to Canada and Mexico.

Sodium hydroxide.--Sodium hydroxide is produced as a coproduct of chlorine via the electrolysis of sodium chloride. The chemical industry is the primary consumer of sodium hydroxide, since sodium hydroxide is one of the most important starting materials for many industrial chemicals. U.S. production of sodium hydroxide reached an estimated 12.8 million short tons in 1980. Recently, increased demand has caused shortages and pushed prices up to extraordinarily high levels.

U.S. imports of sodium hydroxide have been small and relatively insignificant; they were equivalent to approximately 1.6 percent of consumption in 1979. Conversely, exports of sodium hydroxide were over 11 percent of production. It is anticipated that export levels will decline as producers take advantage of the current high domestic prices.

Sodium carbonate.--The largest domestic market for sodium carbonate is in the manufacturing of glass, which consumes approximately 55 percent of domestic output. U.S. production has changed over the past 30 years from 90 percent synthetic to 90 percent natural material. The primary reason for the change from synthetic to natural is the rising cost of energy, which accounts for 30 to 50 percent of production costs for the synthetic material. The 1980 production was estimated at 8.3 million short tons.

The United States imported about 40,000 short tons of sodium carbonate in 1979 and imports were equivalent to less than 1 percent of consumption. Exports, as opposed to imports, are significant, and were slightly less than 1 million short tons, or 12 percent of production.

BEST DOCUMENT AVAILABLE

Sodium bicarbonate.--Domestic production of sodium bicarbonate was 270,000 short tons in 1979, about 30 percent of which was consumed domestically in food production. Imports in 1979 were insignificant, equivalent to approximately 1.2 percent of consumption. Exports were more than 7 percent of production.

BEST DOCUMENT AVAILABLE

Commodity	TSUS item No.
Sodium compounds:	
Bicarbonate	420.72
Carbonate:	
Calcined (soda ash)	420.84
Hydrated and sesquicarbonate	420.86
Chloride (salt):	
In brine	420.92
In bulk	420.94
Other	420.96
Hydroxide	421.08

Note.--For the statutory description, see excerpts from the Tariff Schedules of the United States Annotated (TSUSA), (1981), in app. A. A concordance of the TSUS items included in this summary with related categories in other production, export, and import nomenclatures is found in app. B.

The commodities covered by this summary are found in part 2, subpart C, schedule 4, of the TSUSA.

There are more than 150 inorganic sodium compounds produced in the United States. Less than 30 are large-volume, commercially significant commodities. This summary, however, provides detailed coverage of only those inorganic sodium compounds of commercial significance with regard to international trade. The inorganic sodium compounds highlighted in this summary are sodium chloride, sodium hydroxide, sodium carbonate, and sodium bicarbonate.

Sodium chloride (NaCl).--Commonly called salt (aqueous salt solutions are called brine), sodium chloride is a colorless, transparent crystal or white, crystalline powder and is soluble in water. There are three distinct types of salt--evaporated salt, rock salt, and salt in brine. These types are manufactured in a limited number of grain sizes and purities to meet the average requirements of the various salt-consuming industries.

Although salt is produced in extremely large tonnages, large-scale storage of a variety of types, sizes, and grades is uneconomical because it readily absorbs moisture and it is low priced.

There are three principal methods used to recover salt; shaft mining, solution mining, and solar evaporation. Shaft mining (very similar to coal mining), involves sinking a shaft into a rock-salt vein and then transporting the salt to the surface. Processing consists of crushing, screening, bagging, and loading. The rock salt produced by this technique is further processed into three grades (coarse, coarse crushed, and fine crushed), and amounts to about 54 percent of total U.S. salt production.

BEST DOCUMENT AVAILABLE

Solution mining consists of pumping water into a rock-salt deposit, dissolving the salt, and bringing the brine to the surface. This process accounts for about 32 percent of total U.S. salt production. For ordinary grades of salt, the only further processing required is the removal of hydrogen sulfide and evaporation of water. There are several evaporation processes which may be used; the multiple-effect vacuum-pan system is the most common, and accounts for about 9 percent of total U.S. salt production.

Solar evaporation is the oldest method used to recover salt and is limited to geographical areas that have the right combination of weather conditions and available land. This process, which accounts for only 5 percent of U.S. production, but nearly 50 percent of the world's salt production, is basically a fractional crystallization process using the sun as the energy source. Natural brine, mostly seawater, is pumped to ponds for saturation and further evaporated in crystallizing pans. The resultant salt crystals accumulate on the floor of the pans, are recovered (harvested), and further processed.

There are literally thousands of uses for salt. The most commonly known use is as a flavoring agent. The major use for salt, however, is in the manufacture of such chemicals as sodium carbonate, sodium hydroxide, sodium nitrate, sodium sulfate, sodium cyanide, sodium bisulfate, sodium chlorate, and chlorine gas. Other major uses for salt include highway deicing, food processing, meat packing, and water softening.

Sodium hydroxide (NaOH).--Commonly called caustic soda or lye, sodium hydroxide is a white, somewhat translucent, crystalline solid, very soluble in water, highly alkaline, and extremely corrosive to the skin.

Practically speaking, all of the caustic soda produced in the United States is made by the electrolysis of sodium chloride (salt). 1/ Basically, electrolysis is a process whereby an electric current is passed through a solution of sodium chloride to break it down into its separate reaction products, sodium and chloride ions. The liberated sodium, being positively charged, is attracted to the negatively charged cathode. There are three types of electrolytic cells in commercial use, namely the mercury, diaphragm, and membrane cells. In the mercury cell, the sodium forms an amalgam with mercury which prevents it from reacting with water or the liberated chlorine. The sodium-mercury amalgam is further reacted with water, in a separate reactor, to produce the caustic soda.

The diaphragm cell is similar to the mercury cell in that a solution of sodium chloride is electrolyzed to form sodium and chlorine. However, the liberated sodium is allowed to react with the water to produce caustic soda at the cathode. A diaphragm is used to separate the caustic soda from the chlorine which is liberated at the anode.

In the United States, most caustic soda is produced as a solution made up of 50 percent water, but a water solution of 73 percent sodium hydroxide and anhydrous forms are also available. Solid caustic soda is produced primarily for the export market.

1/ J. J. Leddy et al., "Alkali and Chlorine Products," Encyclopedia of Chemical Technology, 1978, vol. 1, p. 806.

BEST DOCUMENT AVAILABLE

Caustic soda is primarily used to manufacture other organic and inorganic chemicals which in turn are employed in a wide variety of uses. A flow chart of the reaction products and uses of caustic soda is presented in appendix C. Other major uses for caustic soda are for the production of pulp and paper, soap and detergents, alumina, petroleum, textiles, and processed foods.

Sodium carbonate (Na_2CO_3).--Commonly called soda ash, sodium carbonate is a grayish white hygroscopic powder or lump and is soluble in water. The solution is strongly alkaline.

Soda ash can be manufactured by a synthetic (Solvay) or natural process. Basically, in the Solvay process, common salt (sodium chloride) is reacted with limestone (calcium carbonate) to produce sodium carbonate and calcium chloride. The basic chemical reaction takes place only after a series of steps.

The natural soda ash process, which is simpler and more economic than the synthetic process, utilizes the mineral trona, which is found in abundant quantities in the Green River basin of Wyoming. Trona is mined similarly to coal. There are two processes to refine the trona ore. Both are simpler and more economical than the Solvay process described above. Predominantly, the monohydrate process is used to refine the trona ore. In this process, the trona ore is crushed and calcined in a kiln at 160 to 200 centigrade which decomposes the trona and liberates water and carbon dioxide. The calcined material (impure soda ash) is refined into a soda ash solution which is further processed into a dense soda ash product.

Sodium carbonate is used primarily in the manufacture of glass, chemicals, pulp and paper, and soap and detergents.

Sodium bicarbonate ($NaHCO_3$).--Commonly called baking soda, sodium bicarbonate is a white powder or crystalline lump, has a slightly alkaline taste, and is soluble in water. Sodium bicarbonate is manufactured principally by carbonating a pure soda ash (sodium carbonate) solution with purified kiln gas (carbon dioxide). It can also be made by purifying the intermediate sodium bicarbonate formed via the production of soda ash (manufactured during the Solvay process).

Sodium bicarbonate is produced in powder or granular form in several varieties, each depending upon its intended end use. It is used primarily in the manufacture of food, chemicals, and pharmaceuticals; in fire extinguishers; as an animal feed supplement; and to treat waste waters.

Customs Treatment

U.S. customs treatment

Appendix A provides a reproduction of the relevant pages of the 1981 TSUSA. The portions applicable to the sodium compounds covered by this summary are indicated with heavy black brackets in both side margins of the page. Imports of sodium compounds from countries having most-favored-nation

BEST DOCUMENT AVAILABLE

(MFN) status are subject to the rates of duty found in column 1. 1/ The rates of duty for Least Developed Developing Countries (LDDC's) 2/ are in the column marked "LDDC." The LDDC rates are also the final staged rates negotiated under the recent Multilateral Trade Negotiations (MTN) for column 1 duties as presented in the Federal Register, Thursday, December 13, 1979, (44 F.R. 72348). The column 2 rates of duty apply to products, whether imported directly or indirectly, from countries designated by the President as Communist or under Communist control. 3/

Reference is also made in appendix A to the eligibility of articles for duty-free treatment under the Generalized System of Preferences (GSP). The GSP, as provided for under title V of the Trade Act of 1974, provides duty-free treatment of specified eligible articles imported directly from designated beneficiary developing countries. GSP, implemented by Executive Order No. 11888 of November 24, 1975, applies to merchandise imported on or after January 1, 1976, and will remain in effect at least until January 4, 1985, unless modified by the President or terminated.

Not all sodium compounds covered by this summary are subject to duty changes as a result of the concessions granted during the Tokyo round of the MTN. Generally speaking, the United States agreed during the MTN to lower its rates of duty through a series of eight progressive stages. The first stage went into effect on January 1, 1980. The eighth and final stage will become effective January 1, 1987. For the sodium compounds highlighted in this summary, the following table shows the pre-MTN, present, and negotiated column 1 rates of duty, the column 2 rates, and GSP eligibility.

1/ The rates of duty in rate of duty column numbered 1 are Most-Favored-Nation (MFN) rates, and are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(f) of the TSUS. However, such rates would not apply to products of developing countries which are granted preferential tariff treatment under the GSP or under the "LDDC" rate of duty column.

2/ The rates of duty in rate of duty column "LDDC" are preferential rates (reflecting the full U.S. MTN concession rate for a particular item without staging) and are applicable to products of the least developed developing countries designated in general headnote 3(d) of the TSUS which are not granted duty-free treatment under the GSP. If no rate of duty is provided in the "LDDC" column for a particular item, the rate of duty provided in column numbered 1 applies.

3/ The rates of duty in rate of duty column numbered 2 apply to imported products from those Communist countries and areas enumerated in general headnote 3(f) of the TSUS.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Selected sodium compounds: U.S. rates of duty, present and negotiated, by TSUS items

TSUS item No.	Description	Pre-MTN col. 1 rate of duty 1/	Present col. 1 rate of duty 2/	Negotiated col. 1 rate of duty 3/	Column 2: rate of duty	GSP eligibility
420.72	Sodium bicarbonate--	Free	Free	-	Free	No
	Sodium carbonate:					
420.84	Calcined (soda ash).	1.3% ad val.	1.2% ad val.	1.2% ad val.	3.5% ad val.	Yes
420.86	Hydrated and sesqui-carbonate.	0.2¢ per lb.	0.2¢ per lb.	0.1¢ per lb.	0.25¢ per lb.	Yes
	Sodium chloride:					
420.92	In brine----------	5.0% ad val.	4.7% ad val.	3.7% ad val.	20% ad val.	No
420.94	Bulk----------	3.0% ad val.	2.3% ad val.	Free	26% ad val.	Yes
420.96	Other----------	Free	Free	-	11¢ per 100 lb.	No
421.08	Sodium hydroxide----	0.2¢ per lb.	0.15¢ per lb.	Free	0.50¢ lb.	Yes

1/ Effective Jan. 1, 1973-Dec. 31, 1979.
2/ Effective Jan. 1, 1981.
3/ Rates negotiated under Multilateral Trade Negotiations in Geneva (Tokyo round).

The negotiated rates of duty and effective dates for duty reductions, by each stage, for those sodium compounds included in this summary, which are subject to reductions as a result of the MTN agreement, are provided in app. A. Also included are the duty rates in effect prior to the negotiated duty reductions.

There are no nontariff import restrictions which affect the sodium compounds included in this summary. However, if any of these compounds are to be used as a pesticide, they must be registered with the Environmental Protection Agency (EPA). To become registered, the manufacturer must provide EPA with specific data that show the product will: (1) be effective against the pests listed on the label; (2) not injure people, animals, crops, or damage the environment; and (3) not cause illegal residues on food or feed. In addition, registered products must meet strict labeling requirements, and the producer must maintain detailed production and distribution records. Products failing to comply with the registration or labeling requirements will be denied entry into the United States.

In January 1980, the Commission received notice from the U.S. Department of Commerce that the U.S. Department of the Treasury had initiated antidumping investigations with respect to imports of sodium hydroxide from West Germany, France, Italy, and the United Kingdom, but no preliminary or final determination had been made prior to January 1, 1980. The U.S. Department of

Commerce referred the four investigations to the Commission to determine whether there was a reasonable indication that an industry in the United States was materially injured, or threatened with material injury, or the establishment of an industry in the United States was materially retarded, by reason of imports of the merchandise allegedly sold, or likely to be sold, at less than fair value (LTFV).

Accordingly, effective January 1, 1980, the Commission instituted investigation Nos. 731-TA-8 (Preliminary) with respect to imports from West Germany, 731-TA-9 (Preliminary) with respect to imports from France, 731-TA-10 (Preliminary) with respect to imports from Italy, and 731-TA-11 (Preliminary) with respect to imports from the United Kingdom under section 733(a) of the Tariff Act of 1930 as added by title I of the Trade Agreements Act of 1979 to determine, with respect to sodium hydroxide, in solution (liquid caustic soda), provided for in item 421.08 of the TSUS, whether there was a reasonable indication of such material injury, threat thereof, or material retardation of establishment of an industry. The Commission determined unanimously that there was no reasonable indication that an industry in the United States was materially injured, threatened with material injury, or the establishment of an industry in the United States was materially retarded, by reason of imports from the West Germany, France, Italy, or the United Kingdom of sodium hydroxide, in solution (liquid caustic soda), provided for under item No. 421.08 of the TSUS, which were allegedly sold at LTFV.

In May 1980, the PQ Corp., Valley Forge, Pa., filed a petition with both the Commission and the Department of Commerce alleging imports of anhydrous sodium metasilicate were being, or were likely to be, sold in the United States at LTFV. Anhydrous sodium metasilicate is classified under the provision for all sodium silicates in TSUS item 421.34. Accordingly, the Commission instituted a preliminary antidumping investigation under section 733(a) of the Tariff Act of 1930 (19 U.S.C. 1673b(a)) to determine whether there was a reasonable indication that an industry in the United States was materially injured, or was threatened with material injury, or the establishment of an industry in the United States was materially retarded, by reason of imports from France of anhydrous sodium metasilicate, provided for in TSUS item 421.34, allegedly sold or likely to be sold at LTFV. As a result of the information developed in the preliminary investigation, the Commission unanimously determined there was a reasonable indication an industry in the United States was materially injured or threatened with material injury by reason of imports from France of anhydrous sodium metasilicate, provided for in TSUS item 421.34, which were allegedly sold or likely to be sold at LTFV.

In September 1980, the Commission instituted a final investigation following a preliminary determination by the Department of Commerce that anhydrous sodium metasilicate from France is being, or is likely to be, sold in the United States at less than its fair value within the meaning of section 733(b) of the Tariff Act of 1930.

The Commission unanimously determined, pursuant to section 735(b)(1) of the Tariff Act of 1930 (19 U.S.C. 1673d(b)(1)), that an industry in the United States is threatened with material injury by reason of imports of anhydrous sodium metasilicate from France, provided for in TSUS item 421.34, which the Department of Commerce has determined is being, or is likely to be, sold in the United States at LTFV.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Foreign customs treatment

The Customs Cooperation Council Nomenclature (CCCN) is used as the basis for most countries' tariff classification systems. The CCCN classifies the sodium compounds included in this summary, except sodium chloride, in chapter 28. Sodium chloride is classified in CCCN chapter 25. The following table gives the present and negotiated rates of duty for imports of selected inorganic sodium compounds into Canada, the EEC, and Japan.

Selected sodium compounds: Description of commodity and foreign tariff item number, present rate of duty, and negotiated rate of duty

Market	Description of commodity and foreign tariff item No.	Present rate of duty 1/	Negotiated rate of duty 2/
Canada	Sodium bicarbonate (92842)	12.0% ad val.	10.5% ad val.
	Sodium carbonate (928421)	14.4% ad val.	12.5% ad val.
	Sodium chloride 3/ (92501-3 4/)	4.8% ad val.	4.0% ad val.
	Sodium hydroxide (92817-3)	11.3% ad val.	Free

1/ Rates currently applicable to imports from the United States.

2/ Rates negotiated under the Multilateral Trade Negotiations.

3/ Heading 92501 applies to common salt (including rock salt, sea salt and table salt); pure sodium chloride; salt liquors; and sea water. Other salts (item 92501-1), salt for sea or gulf fisheries (item 92501-2), and salt liquors and sea water (item 92501-4) are free of duty.

4/ Table salt made by an admixture of other ingredients, when containing not less than 90 percent of pure salt.

BEST DOCUMENT AVAILABLE

Selected sodium compounds: Description of commodity and foreign tariff item number, present rate of duty, and negotiated rate of duty--Con.

Market	Description of commodity and foreign tariff item No.	Present rate of duty 1/	Negotiated rate of duty 2/
EEC	Sodium bicarbonate (28.42AII)	10.3% ad val.	10.0% ad val.
	Sodium carbonate (28.42AII)	10.3% ad val.	10.0% ad val.
	Sodium chloride (25.01)	73 EUA/100 kg 3/	5.2 EUA/16 kg 3/
	Sodium hydroxide (28.17A)	12.6% ad val.	12.0% ad val.
Japan	Sodium bicarbonate (28.422)	9.0% ad val.	5.8% ad val.
	Sodium carbonate (28.421)	9.6% ad val.	5.8% ad val.
	Sodium chloride (25.01)	Free	-
	Sodium hydroxide (28.171)	7.5% ad val.	8.0% ad val.

1/ Rates currently applicable to imports from the United States.

2/ Rates negotiated under the Multilateral Trade Negotiations.

3/ "EUA" is a European unit of account which is used as a reference in the European Economic Commodity (EEC) tariff schedules. The factors used to convert the EUA to the species of the various EEC countries fluctuate and are determined by the EEC. As of Nov. 24, 1980, the conversion of an EUA was as follows:

1 EUA =
- 40.5722-----Belgian francs/Luxembourg francs
- 2.53405-----German marks
- 2.75049-----Dutch guilders
- 0.587199----pound sterling
- 7.82280-----Danish kroner
- 5.87764-----French francs
- 1207.64-----Italian lira
- 0.675378----Irish pound
- 60.8368-----Greek drachmas

Source: McGoldrick's Handbook of the Canadian Customs Tariff and Excise Duties, 1980-81, McMullin Publishers, LTD, Montreal, Canada, pp. 708, 720, and 724; General Agreement on Tariffs and Trade, Geneva, 1979, vol. 1, pp. 185-95. General Agreement on Tariffs and Trade, Geneva, 1979, vol. IV, pp. 3498, 3506-3511.

General Agreement on Tariffs and Trade, Geneva, 1979, vol. 2, pp. 2326-31; Bulletin International des Douanes, Japan, Year 1978-79, International Customs Tariffs Bureau, Brussels, No. 28, 15th edition, pp. 38, 52-55.

Currently, there are no foreign nontariff barriers (NTB's) to trade of the sodium compounds included in this summary. There are no known NTB's imposed by any GATT signatory which significantly affect trade of the sodium compounds included in this summary.

U.S. Industry

Sodium hydroxide, sodium carbonate, and sodium bicarbonate are classified under Standard Industrial Classification (SIC) code number 2812--Alkalies and Chlorine. 1/ These three commodities account for approximately two-thirds of the industry in terms of shipments, production, and so forth. Chlorine is classified with the alkalies because most manufacturers produce both sodium hydroxide and chlorine simultaneously through the electrolysis of sodium chloride (NaCl). (See p. 4 for a description of the production process.) Consequently, in some instances, the two commodities are considered as one product. More importantly, in the United States, the production of sodium hydroxide is directly related to the demand for and production of chlorine.

Basic data and information

There were 26 domestic firms producing sodium hydroxide in 1980 as opposed to 31 in 1975. Collectively, these firms operated 57 plants in 24 States. One-third of the plants are located in Louisiana and Texas.

Five U.S. firms manufactured natural sodium carbonate in 1980 as compared with four producers in 1975. These firms operate seven plants in two States. One firm operates three plants in California, and the other four firms operate one plant each in Wyoming. In 1975, there were five firms collectively operating seven plants producing synthetic sodium carbonate. Currently, one firm operates a plant in New York.

There are two producers of natural sodium bicarbonate collectively operating three production facilities in Wyoming, Ohio, and Illinois, and one produces synthetic sodium bicarbonate in a plant located in New York. Although the number of producers did not change between 1975 and 1980, only one of the companies which produced sodium bicarbonate in 1975 still produces it today. In addition, in 1975, two of the three firms produced the synthetic material compared with one currently.

Employment data for firms producing sodium hydroxide, carbonate, and/or bicarbonate are not available, but total employment for all firms in the alkalies and chlorine industry declined approximately 15 percent from 1975 to 1980. During the same period, the number of production workers declined nearly 20 percent. Employment for the alkalies and chlorine industry in 1980 is estimated at 12,900, of which 8,000 are production workers. 2/ Production workers earn, on the average, $8 to $10 per hour.

The alkalies and chlorine industry, also called the chlor-alkali industry, has made substantial gains in the value of shipments and value added since a severe decline in 1976 and 1977. The value of shipments of alkalies and chlorine, produced by all industries, increased from $1,707 million in

---

1/ Standard Industrial Classification Manual, 1972, p. 111. SIC code 2812 also includes potassium carbonate, potassium hydroxide, chlorine (compressed or liquefied), and alkalies, not elsewhere classified, which are not included in this summary.

2/ U.S. Department of Commerce, 1980 U.S. Industrial Outlook, p. 115.

BEST DOCUMENT AVAILABLE

 BEST DOCUMENT AVAILABLE

1978 to $1,789 million in 1979 1/ and was projected to reach approximately $2,000 million in 1980. The value added generally runs between 50 to 55 percent of the value of shipments for this industry.

The alkalies and chlorine industry, like the chemical industry as a whole, is relatively capital intensive. For example, the tabulation below compares the 1979 value added per worker for the chemicals and alkalies and chlorine industries with value added per worker in several other industries:

Industry	SIC number	Value added per worker
Chemical	28	$88,200
Alkalies and chlorine	2812	87,500
Motor vehicles	3711	53,800
Cement and concrete	3241,3271-3	45,400
Games, toys, and children's venicles	3944	40,200
Fabricated structural metal products	3441	31,400
Transformers	3612	28,200

Capacity utilization increased from 80 percent in 1978 to 88 percent in 1979. This increase was due to the increased demand for chlorine. Capacity utilization in 1980 is believed to have approximated the 1979 level.

The technology of the alkalies and chlorine industry is dynamic as manufacturers continually strive to lower production costs, employing methods which are energy intensive, reduce pollution, and improve yield. For example, improved membrane cells, used in the production of sodium hydroxide, require less energy, thereby reducing production costs. Some sodium hydroxide producers have converted to the diaphragm-cell process to eliminate the pollution caused by the mercury-cell process. The producers still using the mercury-cell process have reduced the emission of mercury pollutants to comply with EPA standards.

Similar changes have occurred with the production of sodium carbonate. The Solvay process, used to produce synthetic sodium carbonate, created pollution problems with the disposal of a byproduct, calcium chloride. Solvay process plants, generally old and obsolete, have been replaced as the production of sodium carbonate has converted from approximately 90 percent synthetic to almost 90 percent natural.

Financial information

Specific financial data for the alkalies and chlorine industry are not available. However, all producers of alkalies are members of the chemical industry. In fact, 12 producers of sodium hydroxide, 3 producers of natural sodium carbonate, 1 producer of synthetic sodium carbonate, 1 producer of

1/ Bureau of the Census, "Inorganic chemicals," Current Industrial Reports, MA 28A (79)-1, p. 2.

natural sodium bicarbonate, and 1 producer of synthetic sodium bicarbonate are among the top 50 chemical producers. In all, 12 producers of the alkalies covered by this summary are members of that exclusive group of chemical producers.

Total 1979 chemical sales for these 12 firms was collectively more than $29 billion. All companies posted an increase from 1978. For individual companies, these increases ranged from a high of 37 percent to a low of 10 percent. The profit margin, 1/ for these companies, ranged from 8.9 to 0.9 percent. The return on stockholders' equity 2/ ranged from 20.1 percent to 3.7 percent. As a whole, these 12 companies averaged approximately $2.4 billion in chemical sales, a profit margin of 5.7 percent, and a 14-percent return on stockholders' equity. Comparable 1980 data for these 12 companies is not available, however, the trend in profit margin and return on stockholders' equity appears to be downward.

On the whole, 1979 was a healthy year for the companies which produce the sodium compounds covered by this summary. Sales expanded, but gains were primarily attributed to higher prices rather than to higher volumes of sales. In the future, profitability will depend upon the industry's ability to limit overcapacity (overall capacity utilization in 1980 was about 80 percent), and to raise prices to cover the soaring cost of energy.

About one-half of the production costs for sodium hydroxide/chlorine manufacture are for energy. These production costs increased about 50 percent during 1976-80. Such increased costs plus strong demand and short supply for sodium hydroxide have resulted in considerable increases in prices.

Energy cost increases have also affected sodium carbonate production, and are in part responsible for the shift from the energy intensive production of synthetic sodium carbonate to the increased share of production of the natural material.

The U.S. Market

Domestic market profile

Sodium chloride.--The largest domestic market for sodium chloride is the chemical industry, which accounts for almost 60 percent of domestic consumption. Of the sodium chloride consumed by the chemical industry, approximately 95 percent is used to manufacture the chlor-alkalies, i.e., chlorine, sodium hydroxide, and synthetic sodium carbonate. More than 90 percent of the sodium chlorine used to make the chlor-alkalies is sodium chloride in brine. Use of sodium chloride by the chemical industry is dependent on demand for chlorine.

The second largest use of sodium chloride is for deicing of highways. This use accounts for approximately 20 percent of consumption. More than 95 percent of this sodium chloride is the familiar "rock salt." Obviously,

---

1/ Net income as a percentage of net sales for entire operations of company.
2/ Net income as a percentage of net worth for entire operations of company.

BEST DOCUMENT AVAILABLE

weather will influence its demand. No other end use accounted for more than 5 percent of U.S. consumption.

Sodium hydroxide.--The largest domestic market for sodium hydroxide is the chemical industry, which accounts for about 50 percent of domestic consumption. Most of the sodium hydroxide used by the chemical industry is dissipated and does not become an integral part of the end chemical product. Sodium hydroxide competes with other alkalies, such as sodium carbonate, for many uses. Sodium carbonate is less expensive than sodium hydroxide, on a per-ton basis, but the ready availability of sodium hydroxide allows extensive use of this chemical. Demand for sodium hydroxide by the chemical industry is expected to remain strong and grow in proportion to growth of the industry as a whole.

The second largest domestic use for sodium hydroxide is for bleaching and pulping operations by manufacturers of pulp and paper. The demand for sodium hydroxide for these uses is expected to grow in proportion to the growth in the pulp and paper industry.

Other uses for sodium hydroxide include cleaning products, petroleum and natural gas, cellulosics, cotton mercerizing, and so forth. The percent distribution of sodium hydroxide consumed for each market has changed very little during the last several years.

Several factors influence the demand for sodium hydroxide. The supply and availability of sodium hydroxide is contingent on the demand for its coproduct, chlorine, which is uncertain at this time. Government restrictions on the use of chlorinated solvents and other chlorine-containing compounds suppressed demand for chlorine by nearly 4 percent during January-April 1980 compared with demand in the corresponding period in 1979. Chlorine demand is expected to decrease another 5 percent, stabilize, and then increase more slowly over the next several years. Conversely, the demand for sodium hydroxide will continue to grow and will probably exceed the demand for chlorine. This situation has created a shortage of sodium hydroxide that may not be alleviated until the end of 1981.

A second factor influencing the demand for sodium hydroxide is its price. In the past 5 years, production costs have risen by 50 percent primarily because of the rising costs of energy, which is the largest single production expense (30 to 50 percent of total production costs). As a result, many producers have turned to membrane-cell units, which consume less electricity, and cogeneration of power. These three factors, high demand, short supply, and rising production costs, have pushed up the prices for sodium hydroxide. For example, during July-December 1980, the prices for various grades of sodium hydroxide have increased twice, each time raising the price by approximately $15 to $35 per ton, depending on grade and shipping point. The following table gives typical August 1980 and December 1980 prices for several grades.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Sodium hydroxide: U.S. prices by specified grades, August 1980 and December 1980

(In dollars per short ton)

Grade	August	December
50-percent commercial	$190-$240	$220-$270
73-percent commercial	205-255	235-275
50-percent mercury cell-rayon	205-245	235-275

Source: Chemical Marketing Reporter, Aug. 1, 1980, p. 27, and Dec. 8, 1980, p. 34.

Note: Prices are f.o.b. plant or terminal, and, in almost all cases, freight is equalized.

Competition among domestic sodium hydroxide producers is strong. Imports are not expected to pose a threat to domestic production. It is expected that exports will decline to make up for the domestic shortages.

Sodium carbonate.--The largest domestic market, by far, for sodium carbonate is in the manufacture of glass. Glass manufacturing accounts for approximately 55 percent of domestic sodium carbonate consumption. Two of the largest markets for glass, namely automobiles and houses, have been depressed for the past 2 years. However, energy-conserving double-glazed panes for commercial buildings, apartments, and houses have helped to offset the decline in the auto and housing markets. Glass bottles, another major market for sodium carbonate, are being challenged by plastic substitutes. For example, plastics have captured practically the entire market for large-size soft-drink bottles.

The manufacture of chemicals, in which sodium carbonate competes with sodium hydroxide, accounts for another 25 percent of U.S. sodium carbonate consumption. Sodium carbonate should be able to compete favorably with sodium hydroxide for this market during the early 1980's. This is due to the likelihood of expansions in capacity, which should tend to hold down prices.

The remaining 20 percent is consumed primarily by the pulp and paper industry, for waste treatment, soap and detergents, and other miscellaneous uses. The total U.S. demand for sodium carbonate is projected to grow at 2 to 3 percent per year for the next several years.

Sodium bicarbonate.--The largest market, by far, for sodium bicarbonate is as a baking powder in the production of food. The food industry, a relatively slow-growing market, accounts for an estimated 30 percent of domestic sodium bicarbonate consumption.

Chemicals and rubber account for nearly 20 percent of the domestic sodium bicarbonate consumption, pharmaceuticals accounts for approximately 15 percent, and fire extinguishers, almost 10 percent.

BEST DOCUMENT AVAILABLE

The remaining 25 percent is used for sewage treatment, animal feed supplement, rug fresheners, neutralization of acids, and so forth.

The greatest potential for growth lies in the animal feed supplement, rug fresheners, and sewage treatment markets.

U.S. consumption

Sodium chloride.--U.S. consumption of sodium chloride totaled about 50.3 million short tons in 1980, which was an increase of more than 15 percent from the 43.6 million short tons consumed in 1975 (table 1, app. D). Actually, consumption increased more than 8 percent from 1975 to 1976, but was relatively stable from 1976 through 1979. The increase in consumption from 1979 to 1980 was a result of the greater industrial demand for chlorine and sodium hydroxide. The following table provides the U.S. consumption of sodium chloride, by end uses, for 1976 through 1979.

Sodium chloride: U.S. consumption, by end uses, 1976-79

(In thousands of short tons)

Item	1976	1977	1978	1979
Chemicals	27,770	27,030	27,570	39,650
Highway	9,480	9,290	9,330	9,470
Feed dealers and mixers	2,030	1,950	2,050	2,080
Distributors	940	1,120	1,190	1,340
Grocery stores	1,040	1,120	1,190	1,240
Water softening	610	700	860	890
Oil	330	370	480	600
Meatpackers, tanners, casing	610	600	620	600
Metals	380	370	380	400
Canning	280	280	290	300
Other food processing	660	650	760	300
Paper and pulp	240	230	240	200
Textile and dyeing	240	230	190	200
Baking	140	140	140	150
Other	2,400	2,420	2,380	2,230
Total	47,536	46,433	47,616	49,581

Source: Compiled from the official statistics of the U.S. Bureau of Mines.

Note.--Because of rounding, figures may not add to the totals shown.

The Food and Drug Administration (FDA) has been studying the health effects of sodium as a food additive. It is possible that sodium could become subject to FDA regulations leading to limits on the amount of sodium chloride in processed food. Since the use of sodium chloride in food processing and as a food additive is relatively small, its regulation would not appear to have a major impact on total U.S. consumption.

BEST DOCUMENT AVAILABLE

The use of sodium chloride for deicing highways could also cause environmental problems such as corrosion of structures, bridges, and vehicles, and detrimental effects on roadside vegetation and water supplies. Several chemicals can be substituted for sodium chloride in deicing of highways, as a food flavoring, and in certain chemical processes, but at a higher cost. Because of its abundance, however, there is no economic substitute for sodium chloride.

U.S. consumption of sodium chloride is predicted to grow at a modest 2 percent per year for the next several years.

Sodium hydroxide.--Accurate domestic consumption data for sodium hydroxide are not available because, as mentioned earlier, it is dissipated in so many of its uses. However, for most uses, sodium hydroxide has definite proportional relationships with the end products, thereby providing for accurate estimations of consumption. The following table presents an estimated consumption pattern, by end uses, for sodium hydroxide.

Sodium hydroxide: U.S. consumption, by end uses, 1977-80

(In thousands of short tons)

End use	1977	1978	1979	1980
Chemical manufacturing	5,260	5,100	5,960	6,000
Pulp and paper manufacturing	1,720	1,670	1,950	1,960
Aluminum processing	610	590	690	690
Textiles	610	590	690	690
Petroleum	400	390	460	460
Soaps and detergents	400	390	460	460
Other	1,120	1,070	1,260	1,280
Total	10,120	9,800	11,470	11,540

Source: Estimated by the staff of the U.S. International Trade Commission.

Overall consumption of sodium hydroxide is projected to grow at an average annual rate of 3 to 5 percent per year through 1984. Imports, which averaged less than 2 percent annually of U.S. consumption during 1975-79, are not expected to be significant and should remain near current levels.

Sodium carbonate.--U.S. consumption of sodium carbonate increased steadily from 1975 to 1978 from slightly less than 6.6 million short tons to more than 7.5 million short tons. However, consumption declined by approximately 1 percent in 1979 primarily because of declining automobile production and housing starts (table 3). Although specific end-use data are not available for 1979, the following table provides the U.S. consumption pattern for sodium carbonate, during 1975-78.

BEST DOCUMENT AVAILABLE

Sodium carbonate: U.S. consumption, by end uses, 1975-78

(In thousands of short tons)

End use	1975	1976	1977	1978
Glass	3,390	3,590	3,980	4,170
Chemicals	1,630	1,660	1,670	1,720
Soap and detergents	330	340	340	350
Pulp and paper	240	260	260	260
Water treatment	200	220	220	220
Other	795	797	813	824
Total	6,585	6,867	7,283	7,544

Source: U.S. Bureau of MInes, Soda Ash (Sodium Carbonate), Sodium Sulfate, and Sodium, Dec. 1979, p. 8.

Note.--Because of rounding, figures may not add to the totals shown.

Future consumption of sodium carbonate will depend, to a large degree, on the automobile and housing markets. U.S. consumption is expected to grow at 1 to 2 percent per year over the next several years. Imports are insignificant, accounting for less than 1 percent of consumption.

Sodium bicarbonate.--U.S. consumption of sodium bicarbonate increased from approximately 228,000 short tons in 1975 to an estimated 270,000 short tons in 1980, or by nearly 20 percent. Consumption is expected to grow 3 to 5 percent per year during 1981-85. Growth in well established markets, such as food and pharmaceuticals, is expected to be at the rate of 1 to 2 percent per year. The animal feed, carpet freshener, and sewage treatment markets offer the largest growth potential. The following table compares the 1977 with the estimated 1980 consumption patterns, by end markets, for sodium bicarbonate.

BEST DOCUMENT AVAILABLE

Sodium bicarbonate: U.S. consumption, by end markets, 1977 and 1980

(In thousands of short tons)

End market	1977	1980 1/
Food	83	81
Chemicals and rubber	54	54
Pharmaceuticals	38	41
Fire extinguishers	23	27
Animal feed	2/	25
Rug fresheners	2/	10
Exports	5	18
Others	47	14
Total	250	270

1/ Estimated by the staff of the U.S. International Trade Commission.
2/ Not available, included in others.

Source: Compiled from "Bicarb makers must digest new capacity," Chemical Week, Mar. 1, 1978, p. 19, and Chemical Week, Jun. 4, 1980, p.32, except as noted.

Note.--Because of rounding, figures may not add to the totals shown.

The ratio of imports to U.S. consumption increased from less than 1 percent in 1975 to approximately 3 percent in 1978, and then declined to approximately 1 percent in 1979. The 1980 imports-to-consumption ratio will probably remain at about 1 percent.

U.S. production

Sodium chloride.--U.S. production of sodium chloride increased from 41.7 million short tons in 1975 to 43.8 million short tons in 1976. Production declined approximately 2 percent from 1976 to 1977, leveled off in 1978, and then increased 8 percent in 1979 to more than 46.3 million short tons. Throughout this period, sodium chloride in brine accounted for more than 52 percent of total domestic production; rock salt accounted for almost 35 percent; and the production of sodium chloride, via evaporation, accounted for slightly more than 13 percent. In the United States, the primary location of the resources are in the Northern, Southwestern, and Central Western States. The following table provides the U.S. production data for sodium chloride, by methods of recovery, for 1975-79.

BEST DOCUMENT AVAILABLE

Sodium chloride: U.S. production, by methods of recovery, 1975-79

(In thousands of short tons)

Method of recovery	1975	1976	1977	1978	1979
Brine 1/	21,940	22,710	22,520	22,340	24,960
Rock 1/	14,500	15,530	14,790	14,690	15,060
Evaporated 1/	5,400	5,560	5,610	5,850	6,290
Total	41,710	43,801	42,922	42,878	46,317

1/ Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from the official statistics of the U.S. Bureau of Mines, except as noted.

Note.--Because of rounding, figures may not add to the totals shown.

As mentioned previously, the principal producers of sodium chloride from brine wells are the chemical companies which convert the sodium chloride into chlorine and sodium hydroxide. Many of these companies have their chlor-alkali plants located on top of their brine wells. Consequently, production of sodium chloride from brine wells will fluctuate with the demand for chlorine and/or sodium hydroxide.

Solid sodium chloride (rock salt) is usually pure and requires little further processing. Production of this type of sodium chloride depends upon the weather conditions. There were several other factors that influenced production of rock salt in 1979: (1) an explosion and subsequent closing of one mine for nearly 6 months; (2) a strike lasting 3 months; and (3) the conversion of a mine to a strategic petroleum reserve storage site.

The other recovery methods for sodium chloride are solar evaporation of seawater and the evaporation of sodium chloride in brine via vacuum or open pan.

The ratio of imports to production increased from 7.4 percent in 1975 to 11.6 percent in 1978, and then declined to 10.8 percent in 1979.

Sodium hydroxide.--U.S. production of sodium hydroxide grew by nearly 190 percent between 1955 and 1974. The recession of 1975 resulted in a 14-percent decline in production. From 1975 to 1979, production increased by about one third but declined by 11 percent from 1979 to 1980, because of the decreased demand for coproduct chlorine. Shipments have followed a nearly identical pattern. The following table presents U.S. production and shipments for sodium hydroxide for 1975-80.

BEST DOCUMENT AVAILABLE

Sodium hydroxide: U.S. production and shipments, 1975-80

(In thousands of short tons)

Item	1975	1976	1977	1978	1979	1980
Production	9,640	10,520	11,000	11,310	12,770	11,311
Shipments	7,040	7,690	8,240	8,310	9,270	1/ 8,200

1/ Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

In terms of U.S. production, sodium hydroxide ranks in the top 10 largest-volume chemicals. In 1975, sodium hydroxide was topped in production only by sulfuric acid, lime, ammonia (anhydrous), oxygen (high and low purity), and ethylene. 1/

Production capacity for sodium hydroxide increased from approximately 14.4 million short tons in 1977 to more than 15.8 million short tons in 1980, or by nearly 10 percent. The capacity utilization fluctuated between 76 and 85 percent during 1977-79. It was estimated to be down to only 72 percent in 1980 as capacity increased faster than production. The following table shows capacity, production, and capacity utilization of sodium hydroxide plants during 1977-80.

Sodium hydroxide: U.S. capacity, production, and capacity utilization, 1977-80

Item	1977	1978	1979	1980
Capacity (1,000 short tons)	14,440	14,890	1/ 15,120	1/ 15,800
Production (do)	11,000	11,310	12,770	11,311
Capacity utilization (percent)	76.2	76.0	84.5	71.6

1/ Estimated.

Source: Capacity, First Boston Corp's Chemical Research Group; production, compiled from official statistics of the U.S. Department of Commerce.

It will take several years to reach and exceed the 90 plus capacity utilization rates of the early 1970's.

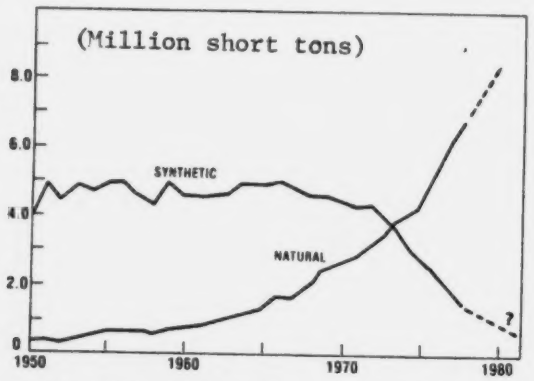
As previously mentioned, there are at least 26 domestic firms producing sodium hydroxide. One company possesses by far the greatest production capacity, nearly 33 percent. The top four producers, in terms of capacity, account for approximately 60 percent of the production capacity.

1/ J. J. Leddy et al., "Alkali and Chlorine Products," Encyclopedia of Chemical Technology, p. 800.

BEST DOCUMENT AVAILABLE

The four leading producers will probably gain a larger share of the market, particularly if they expand their production facilities in the future. Their substantial captive use provides them with distinct advantages. Two producers have announced major expansions, one of which is due to begin producing in early 1981, while the other is not expected to produce until 1983.

Sodium carbonate.--U.S. production of sodium carbonate has changed dramatically over the past 30 years. In 1950, approximately 91 percent of the sodium carbonate produced was synthetic. As late as 1973, slightly more than 50 percent of production was by way of the synthetic process. However, during the past decade, antipollution legislation and the rising cost of energy, labor, and transportation have forced the closing of all but one of the plants producing synthetic sodium carbonate. The following figure graphically illustrates the gradual conversion from the production of synthetic to naturally occurring mineral-sourced materials.



U.S. production of sodium carbonate

Source: U.S. Bureau of Mines, Soda Ash (Sodium Carbonate), Sodium Sulfate, and Sodium, Dec. 1979, p. 2

BEST DOCUMENT AVAILABLE

Currently, there are five domestic producers of natural sodium carbonate and only one producer of the synthetic material.

The producer of synthetic sodium carbonate also made the transition to producing the natural material. As a result, it has the largest capacity of any producer of sodium carbonate (natural and synthetic) and the second largest capacity of the natural product. The company plans to increase its capacity by 1984 and to expand again in the late 1980's. Other companies reportedly plan to expand production capacity over the next few years.

U.S. production of natural and synthetic sodium carbonate increased from 7.1 million short tons in 1975 to approximately 8.3 million short tons in 1978 and 1979. Production in 1980 is expected to be at the 1978-79 level. The following table provides an overview of the sodium carbonate industry.

Sodium carbonate: U.S. capacity, production, inventories, capacity utilization, and value, 1975-80

Year	Capacity	Production	Inventories 1/	Capacity utilization	Value
	1,000 short tons			Percent	1,000 dollars
1975	2/	7,130	54	2/	2/
1976	2/	7,560	102	2/	259,253
1977	9,880	8,040	101	81.4	357,516
1978	9,600	8,300	76	86.3	370,147
1979	9,600	8,250	3/ 87	85.9	500,000
1980	9,600	3/ 8,300	2/	3/ 86.5	3/ 800,000

1/ End of year, natural sodium carbonate only.
2/ Not available.
3/ Estimated by the staff of the U.S. International Trade Commission.

Source: U.S. Bureau of Mines, Soda Ash (Sodium Carbonate), Sodium Sulfate, and Sodium, Dec. 1979, except as noted.

U.S. producers of sodium carbonate are in an enviable position. They have a rich, practically inexhaustible supply of raw material, good location, and excellent shipping networks. At present they can sell all the sodium carbonate they can manufacture. Consequently, their sales are production limited, not demand limited.

Sodium bicarbonate.--There are three domestic manufacturers of sodium bicarbonate operating a total of four production facilities. One of these is the world's largest producer, with one producing facility in Wyoming and one in Ohio. The other producers' plants are in Illinois and New York.

Two companies produce natural sodium bicarbonate from the mineral trona. The third company produces synthetic sodium bicarbonate using sodium carbonate as the raw material. During the 1970's, four major chemical companies shut down sodium bicarbonate plants with collective annual capacities of 139,000 short tons. All of these produced synthetic sodium bicarbonate. This

movement away from synthetic to natural sodium bicarbonate occurred because the synthetic material is manufactured by the energy intensive, and consequently more expensive, Solvay process.

There are no detectable differences between the natural and synthetic product. There are no major production differences between the producers of natural sodium bicarbonate. The difference lies in the quality of the starting material.

Currently, the sodium bicarbonate industry has excess capacity. The 1981 capacity is 420,000 short tons; 1980 demand was only about 270,000 short tons. This imbalance in capacity and production will probably continue since demand is expected to grow only an estimated 3 percent per year.

U.S. imports

Sodium chloride.--Total U.S. imports of sodium chloride increased more than 64 percent from 1975 to 1979. The 1975 imports were approximately 3.2 million short tons, valued at $15.3 million, while the 1979 imports were more than 5.3 million short tons, valued at $40.9 million. One third of the imports come from Canada, and Mexico and the Bahamas accounted for more than 20 percent each, (tables 5, 6, and 7).

Imports of sodium chloride in bulk from designated beneficiary countries are eligible for duty-free treatement under the GSP. In 1979 and January-October 1980, GSP imports accounted for more than 50 percent of total imports of sodium chloride in bulk. GSP imports were received from Mexico, Bahamas, Netherlands Antilles, Colombia, Chile, Brazil, Tunisia, and Nepal.

The import-to-consumption ratio increased from approximately 7.4 percent in 1975 to almost 10.8 percent in 1979.

Sodium hydroxide.--U.S. imports of sodium hydroxide are small and relatively insignificant for three reasons. First, the United States has historically had, and will continue to have, an abundance of sodium chloride, the basic starting material for sodium hydroxide. Second, the United States has adequate domestic production facilities, and third, sodium hydroxide is expensive to transport long distances since, for the principal product grade, 50 percent of the solution is water. From 1975 to 1979, imports accounted for less than 3 percent of consumption annually.

U.S. imports of sodium hydroxide (liquid and anhydrous) more than doubled from more than 108,000 short tons, valued at $15.8 million, in 1975, to 283,000 short tons, valued at $22.1 million, in 1978. Imports in 1979 dropped by 35 percent. There was another 35 percent decline in imports during January-October 1980 when compared with imports in the corresponding period of 1979 (table 8). Canada is the principal source of imports, followed by West Germany and Belgium.

Sodium hydroxide was designated by the President as an article eligible for GSP treatment. However, there were no imports from eligible countries through October 1980.

BEST DOCUMENT AVAILABLE

Sodium carbonate.--Total U.S. imports of sodium carbonates 1/ dropped from 2,447 short tons, valued at $349,000, in 1975 to only 33 short tons, valued at $24,000, in 1976, and then increased to 40,314 short tons, valued at $4.3 million, in 1979. January-October 1980 imports were 58 percent less than imports in the corresponding period of 1979. Imports of the hydrated and sesquicarbonate sodium carbonate have been insignificant and were less than 0.2 percent of total imports for 1979 (tables 9 and 10).

Practically all of the calcined sodium carbonate has come from Canada. Imports, which were less than 1 percent of consumption in 1979, are not expected to grow or be significant in the near future.

Imports of sodium carbonate were designated by the President as articles eligible for GSP treatment. The only GSP imports recorded, from January 1975 to October 1980, were less than 1,000 pounds from India.

Sodium bicarbonate.--Imports of sodium bicarbonate increased from 653 short tons, valued at $79,000, in 1975, to 6,900 short tons, valued at $774,000, in 1978. Imports in 1979 decreased to 3,140 short tons, valued at $394,000. Imports during January-October 1980 totaled 2,200 short tons, valued at $395,000, which represented a 9 percent decline compared with imports in the corresponding period of 1979 (table 11).

The United Kingdom accounts for the bulk of total imports, with Mexico supplying most of the remainder.

In 1977, Mexico built a sodium bicarbonate plant with a capacity of approximately 10,000 to 12,000 tons per year. This plant produces enough sodium bicarbonate to meet Mexico's domestic requirements, as well as excess product to sell in the Southwestern United States. These export sales, altnough a relatively modest 688 short tons in 1979, are made possible because of Mexico's favorable labor market and transportation costs. The Mexican sodium bicarbonate penetration into the U.S. market does not overly concern U.S. producers; however, the fact that Mexico has a tariff in excess of 50 percent ad valorem for imports of sodium bicarbonate does concern some U.S. firms.

Sodium bicarbonate has not been designated an article eligible for GSP treatment. Consequently, GSP beneficiary developing countries do not receive preferential treatment.

The International Market

International market profile

Sodium chloride.--Worldwide resources of sodium chloride are, practically speaking, unlimited. In 1979, worldwide production of sodium chloride was an

1/ Includes sodium carbonate: calcined (soda ash) and sodium carbonate: hydrated and sesquicarbonate.

BEST DOCUMENT AVAILABLE

estimated 185 million short tons. 1/ Approximately 85 percent of the production was accounted for by 13 countries. 2/ The 1979 production was slightly more than 2 percent more than the 1978 total. In 1979, Europe accounted for almost 40 percent of the world's production; North America, 33 percent; Asia, 19 percent; South America, 3 percent; Oceania, 3 percent; and Africa, 2 percent. The following table provides world sodium chloride production, by continents and by major countries, for 1976-79.

1/ U.S. Bureau of Mines, Minerals Yearbook, 1978-79, p. 758.
2/ United States, Mainland China, U.S.S.R., West Germany, United Kingdom, France, Canada, Mexico, Italy, Romania, Australia, Poland, and India.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Sodium chloride: World production, by continents and by major producing countries, 1976-79

(In thousands of short tons)

Continent and country	1976	1977	1978	1/ 1979
Grand Total	176,310	174,570	180,510	184,960
North America	58,130	58,060	58,710	61,560
United States	43,800	42,920	42,880	46,320
Canada	6,610	6,660	7,110	7,360
Mexico	5,060	5,400	6,210	6,200
Bahamas	1,490	1,840	1,800	1,500
All other	1,170	1,240	710	180
South America	5,820	6,100	6,040	6,120
Brazil	2,730	2,730	3,010	3,100
Argentina	730	1,270	1,060	1,100
Colombia	1,230	1,020	830	820
All other	1,130	1,080	1,140	1,100
Europe	69,330	71,440	72,390	73,770
U.S.S.R	15,650	15,760	15,980	16,200
West Germany	12,480	13,580	13,950	14,000
United Kingdom	8,830	9,040	8,060	8,100
France	6,700	5,900	7,190	7,580
Romania	4,640	5,000	5,220	5,300
Italy	4,420	5,550	5,440	5,600
Poland	4,210	4,800	4,850	5,000
Spain	3,480	2,680	2,750	2,900
Netherlands	3,340	3,430	3,240	3,200
East Germany	2,820	2,910	3,020	3,060
All other	2,760	2,790	2,690	2,830
Africa	2,620	2,630	3,060	3,140
Egypt	530	660	830	840
Tunisia	530	450	470	470
All other	1,564	1,520	1,760	1,830
Asia	34,310	31,100	35,030	35,290
Peoples Republic of China	22,000	19,000	21,540	22,000
India	4,890	4,140	4,830	5,000
Japan	1,130	1,160	1,180	1,200
All other	6,290	6,800	7,480	7,090
Oceania	6,100	5,260	5,210	5,080
Australia	6,050	5,200	5,140	5,000
All other	50	60	70	80

1/ Estimated.

Source: U.S. Bureau of Mines, Minerals Yearbook, 1978-79, pp. 759-761.

Note.--Because of rounding, figures may not add to the totals shown.

BEST DOCUMENT AVAILABLE

Sodium hydroxide.--Sodium hydroxide is truly an international commodity because of its importance in the production of other chemicals and because of the worldwide abundance of sodium chloride, its basic raw material. The following table provides data on production, by selected countries for 1976-1977.

Sodium hydroxide: Production, by selected countries, 1976 and 1977

(In thousands of short tons)

Country	1976	1977
United States	10,520	11,000
West Germany	3,406	3,396
Japan	3,106	3,070
France	1,404	1,447
Italy	1,250	1,229
Canada	1,102	1,108
Spain	485	505
Sweden	495	446
Finland	195	205
Australia	153	142
Norway	82	80
Denmark	12	14
Turkey	34	1/

1/ Not available.

Source: Compiled from OECD Chemicals, 1979, p. 31.

There are several factors that may influence U.S. export demand and competitiveness:

The cost of energy.--For many years the United States has enjoyed low cost energy, when compared with that for the other industralized countries. As the cost of energy increases, so will the cost to produce sodium hydroxide, since, as pointed out earlier, energy accounts for up to 50 percent of the total production costs.

The demand for chlorine.--If the demand for chlorine continues to fall short of that of sodium hydroxide, a serious shortage for sodium hydroxide will result. This will drive its price up domestically, making it more profitable for U.S. producers to sell in the United States, thereby decreasing exports. If this occurs, countries importing U.S. sodium hydroxide will have to seek other sources of supply or increase their domestic production. This could be detrimental to the U.S. producers in the long run, because they may not be able to recapture their share of the worldwide market if subsequent increased demand for domestic chlorine results in an excess of sodium hydroxide.

Production of alumina.--A large share of U.S. exports of sodium hydroxide have been to countries who produce alumina. There is the possibility that a production process for alumina could be developed that doesn't require sodium hydroxide.

The recent price parity between U.S. and European sodium hydroxide.--This current parity discourages movement of sodium hydroxide across the Atlantic.

The recent formation of a Japanese sodium hydroxide export cartel.--Japan's Fair Trading Commission recently approved a cartel of 15 Japanese producers of sodium hydroxide. This cartel will initially concentrate on increasing exports to Australia for that country's aluminum industry. Australia is the largest market for U.S. sodium hydroxide, receiving 24 percent of the total exports in 1979. It is unlikely that the Japanese cartel can penetrate the second and third major U.S. export markets of Canada and Jamaica because of favorable proximity of the United States to these countries and the cost of transportation.

Sodium carbonate.--Fortunately for the United States, the largest known deposits of natural sodium carbonate (trona) in the world are in the Green River basin of southwest Wyoming. Searles Lake, in California, is a secondary U.S. source. Only small amounts of natural sodium carbonate are produced outside the United States; the United States produces approximately 98 percent of the world's natural sodium carbonate. This puts U.S. producers in a favorable cost position versus foreign producers who manufacture the more expensive synthetic material. The following table provides world production figures for sodium carbonate.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Sodium carbonate: World production, by continents and by major producing countries, 1978

(In thousands of short tons)

Continent and country	1978
Grand Total	31,070
North America	9,290
United States	8,290
Canada	500
Mexico	500
South America	250
Europe	17,310
U.S.S.R.	5,900
United Kingdom	1,760
France	1,490
West Germany	1,360
Bulgaria	1,300
Romania	940
Italy	800
Poland	750
Spain	550
All other	2,460
Africa	180
Asia	3,860
China	1,470
Japan	1,320
India	650
All other	420
Australia	180

Source: U.S. Bureau of Mines, Soda Ash (Sodium Carbonate), Sodium Sulfate, and Sodium, Dec. 1979, p. 3.

Worldwide demand for sodium carbonate is increasing faster than U.S. demand. Domestic expansion and competition is accelerating faster than U.S. consumption; consequently, U.S. producers are turning toward the export markets with increasing interest. Western Europe, where approximately 30 percent of the world's sodium carbonate is produced, is a potentially lucrative market for U.S. exports. U.S. producers enjoy distinct advantages in energy, labor, capital costs, and fewer environmental problems with the production of the natural sodium carbonate than their European counterparts. Several European producers are currently facing economic and environmental problems. For example, the United Kingdom's sole producer of sodium carbonate recently announced that it will reduce its workforce by 18 percent in its three sodium carbonate plants during the next 2 years in an effort to reduce costs and improve efficiency. Additionally, this producer plans to spend $15 million to modernize one of its facilities. A major chemical firm in Belgium is also plagued with environmental problems and the rising cost of energy.

In addition to rising production costs and environmental problems, Western Europe has been the target of increasing imports of sodium carbonate

from the U.S.S.R. and other Eastern bloc countries. The European Community recently levied provisional antidumping duties on certain types of Soviet exports into Western Europe because of a 33-percent price differential. 1/ The antidumping duties appear to be effective since other eastern European producers have raised their export prices.

U.S. exports

Sodium chloride.--U.S. exports of sodium chloride declined more than 41 percent from 1.3 million short tons, valued at $9.1 million, in 1975 to 776,000 short tons, valued at $9.8 million, in 1978. Exports increased, however, to 2.1 million short tons, valued at $9.5 million in 1979. The January-October 1980 exports were 27 percent more than the exports for the corresponding period of 1979. Increased exports to Canada and Mexico accounted for the increase in 1979. During January 1975-October 1980, exports to Canada accounted for more than 70 percent of total exports (table 12).

Exports are relatively unimportant to U.S. producers. During 1975-79, exports as a share of U.S. production did not exceed 4.5 percent (1979).

Sodium hydroxide.--U.S. exports of solutions of sodium hydroxide increased from 982,000 short tons, valued at $116.2 million, in 1975 to 1.7 million short tons, valued at $121.7 million, in 1978. Exports declined in 1979 to 1.3 million short tons, valued at $126 million. The January-October 1980 exports were about 10 percent greater than the exports for the corresponding period of 1979. It is expected that exports will remain depressed during 1981 owing to the U.S. shortage of sodium hydroxide, as previously discussed. The major export markets are Australia, Canada, Jamaica, and Surinam (table 13).

Exports of anhydrous (dry) sodium hydroxide declined from 127,000 short tons, valued at $39.4 million, in 1975, to 38,000 short tons, valued at $5.9 million, in 1977. Thereafter, exports increased to 151 million short tons, valued at $26 million in 1979 (table 14). The January-October 1980 exports of anhydrous sodium hydroxide are 15 percent less than the exports for the corresponding period of 1979. The principal export markets in 1979 and January-October 1980 were China and Indonesia.

Exports of solutions of sodium hydroxide accounted for 10.8 percent of production in 1979. Exports of anhydrous sodium hydroxide are insignificant, accounting for slightly more than 1 percent of production.

Sodium carbonate.--U.S. exports of sodium carbonate, calcined, increased from slightly more than 529,000 short tons, valued at $45.8 million, in 1975, to 997,000 short tons, valued at $86.7 million, in 1979. Exports during January-October 1980 were more than 20 percent greater than exports for the corresponding period of 1979 (table 15). U.S. exports of natural sodium carbonate, which accounted for approximately 12 percent of production in 1979, are expected to increase--particularly those destined for Western Europe.

1/ Europa Chemie, no. 34/79, p. 625.

BEST DOCUMENT AVAILABLE

Sodium bicarbonate.--U.S. exports of sodium bicarbonate increased from 3,340 short tons, valued at $2.5 million, in 1975 to 18,190 short tons, valued at $4.9 million, in 1979, or more than 4-fold by quantity. During January-October 1980, exports amounted to 14,970 short tons, valued at $4.5 million, constituting nearly a 2-percent increase when compared with exports for the corresponding period in 1979 (table 16). Canada is the principal export market for U.S. sodium bicarbonate, its share of the export market having increased from 56 percent in 1975 to more than 73 percent during January-October 1980. On the other hand, exports to Mexico declined from more than 16 percent to only 1 percent during the corresponding period of 1979. As a result of this decline in exports to Mexico, Brazil has become the second largest export market, receiving more than 20 percent in 1979.

BEST DOCUMENT AVAILABLE

Appendix A

Part 2, Subpart C, of Schedule 4, of the Tariff Schedules of the United States Annotated (1981) and Staged Rates of Duty

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	LDDC	2
			Subpart C. - Inorganic Chemical Compounds				
			Subpart C headnote:				
			1. This subpart does not include any organic compounds. For the purposes of this subpart, inorganic compounds containing only one kind of cation are classifiable according to the cation constituent as indicated in the alphabetical listing set forth in this subpart; and inorganic compounds containing two or more different kinds of cations are classifiable according to the cation constituent thereof first named in the alphabetical listing in this subpart. Inorganic compounds, having no cations or none of the cation constituents of which are named in this subpart, are covered by the provision for other inorganic compounds (item 423.00).				
			Aluminum compounds:				
A	417.10	00	Ammonium sulfate (ammonia alum)	lb.	1.6¢ ad val.	1.6¢ ad val.	9.9¢ ad val.
	417.12		Hydroxide and oxide (alumina)		Free		0.5¢ per lb.
		20	Aluminum hydroxide	lb.			
		40	Aluminum oxide (alumina)	lb.			
A	417.14	00	Potassium sulfate (potash alum)	lb.	0.5¢ per lb.		0.75¢ per lb.
A	417.16	00	Sulfate	lb.	1¢ ad val.	Free	10¢ ad val.
A	417.18	00	Other	lb.	3¢ ad val.	Free	25¢ ad val.
			Ammonium compounds:				
A	417.20	00	Ammonia, aqua	lb.	3.8¢ ad val.	3.1¢ ad val.	25¢ ad val.
A	417.22 1/	00	Ammonia, liquid anhydrous	lb.	3.9¢ ad val.	2.8¢ ad val.	20¢ ad val.
A	417.24	00	Carbonate and bicarbonate	lb.	1.9¢ ad val.	1.7¢ ad val.	16¢ ad val.
A	417.26	00	Chloride	lb.	3.5¢ ad val.	2.9¢ ad val.	18¢ ad val.
A	417.28	00	Molybdate	lb.	5.7¢ ad val.	4.3¢ ad val.	29¢ ad val.
			molybdenum content	lb.			
A	417.30	00	Nitrate	lb.	Free		15¢ ad val.
A	417.32	00	Perchlorate	lb.	0.2¢ ad val.		4¢ ad val.
A	417.34	00	Phosphate	lb.	1.6¢ ad val.	1.3¢ ad val.	9.5¢ ad val.
A	417.36	00	Silicofluoride	lb.	0.7¢ ad val.	0.7¢ ad val.	25¢ ad val.
A	417.38	00	Sulfate	lb.	1.0¢ ad val.	1.1¢ ad val.	25¢ ad val.
	417.40	00	Tungstate	lb.	12.5¢ ad val.	10¢ ad val.	49.5¢ ad val
			tungsten content	lb.			
A	417.42	00	Vanadate	lb.	14.0¢ ad val.	11.2¢ ad val.	40¢ ad val.
A	417.44		Other		3.8¢ ad val.	3.1¢ ad val.	25¢ ad val.
		20	Ammonium perrhenate	lb.			
		40	Other	lb.			

1/ Certain imports of anhydrous ammonia are subject to temporary quotas. See item 913.10 in part 2A, Appendix to Tariff Schedules.

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

BEST DOCUMENT AVAILABLE

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
			Potassium compounds (con.):				
A	420.36		Other	.....	3.8% ad val.	3.1% ad val.	25% ad val.
		05	Potassium bromate	lb.			
		10	Potassium fluosilicate	lb.			
		20	Potassium fluotantalate	lb.			
		30	Potassium metabisulfite	lb.			
		40	Potassium phosphates	lb.			
		50	Potassium stannate	lb.			
		60	Other	lb.			
A	420.40	00	Rhodium compounds	lb.....	4.7% ad val.	3.7% ad val.	25% ad val.
			Selenium compounds:				
	420.50	00	Dioxide	lb.....	Free		Free
	420.52	00	Salts	lb.....	Free		Free
A	420.54	00	Other	lb.....	4.7% ad val.	3.7% ad val.	25% ad val.
A	420.60	00	Silver compounds	lb.....	4.7% ad val.	3.7% ad val.	25% ad val.
			Sodium compounds:				
A	420.68	00	Aluminate	lb.....	3.8% ad val.	3.1% ad val.	25% ad val.
A	420.70	00	Arsenate	lb.....	0.3¢ per lb.		1¢ per lb.
	420.72	00	Bicarbonate	lb.....	Free		Free
	420.74	00	Bisulfate (niter cake)	lb.....	Free		Free
			Borate:				
	420.76	00	Crude	lb.....	Free		Free
A	420.78	00	Other	lb.....	0.05¢ per lb.	0.03¢ per lb.	0.125¢ per lb.
A*	420.82	00	Bromide	lb.....	6.7¢ per lb.	3¢ per lb.	10¢ per lb.
			Carbonate:				
A	420.84	00	Calcined (soda ash)	lb.....	1.2% ad val.		8.5% ad val.
A	420.86	00	Hydrated and sesquicarbonate	lb.....	0.2¢ per lb.		0.25¢ per lb.
A	420.88	00	Chlorate	lb.....	2.4% ad val.	Free	13% ad val.
			Chloride (salt):				
	420.92	00	In brine	.....	4.7% ad val.	3.7% ad val.	20% ad val.
			anhydrous salt content	Cwt.			
A	420.94	00	In bulk	Cwt.....	2.3% ad val.	Free	26% ad val.
	420.96	00	Other	Cwt.....	Free		11¢ per 100 lb.
A	420.98	00	Chromate and dichromate	lb.....	2.8% ad val.	2.4% ad val.	8.5% ad val.
	421.02	00	Cyanide	lb.....	Free		Free
A	421.04	00	Ferrocyanide	lb.....	1.8% ad val.	1.7% ad val.	8.5% ad val.
A	421.06	00	Hydrosulfite	lb.....	17.5% ad val.		35% ad val.
A	421.08	00	Hydroxide	lb.....	0.15¢ per lb.	Free	0.50¢ per lb.
A	421.10	00	Molybdate	lb.....	4.8% ad val.	3.7% ad val.	25.5% ad val.
			molybdenum content	lb.			
A	421.14	00	Nitrite	lb.....	18.3% ad val.	8.6% ad val.	54% ad val.
			Phosphate, except pyrophosphates:				
A	421.16	00	Containing by weight not over 45% of water of crystallization	lb.....	1.5% ad val.	1.4% ad val.	6% ad val.
A	421.18	00	Containing by weight over 45% of water of crystallization	lb.....	3% ad val.	2.5% ad val.	11.5% ad val.
A	421.22	00	Pyrophosphates	lb.....	4.7% ad val.	3.7% ad val.	25% ad val.
A	421.34	00	Silicates	lb.....	1.1% ad val.		3% ad val.
A	421.36	00	Silicofluoride	lb.....	5.4% ad val.	4.1% ad val.	62.5% ad val.

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

Selected sodium compounds: Schedule of staged rate reductions, 1980-87

Item	Description	Rate from which staged	Rates of duty effective with respect to articles entered on or after Jan. 1--							
			1980	1981	1982	1983	1984	1985	1986	1987
	Sodium compounds:									
420.84	Carbonate (calcined) (soda ash).	1.3% ad val.	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
420.86	Carbonate (hydrated and sequicarbonate).	0.2¢/lb	0.2¢/lb	0.2¢/lb	0.2¢/lb	0.1¢/lb	0.1¢/lb	0.1¢/lb	0.1¢/lb	0.1¢/lb
420.92	Chloride (salt (in brine).	5% ad val.	4.8%	4.7%	4.5%	4.4%	4.2%	4%	3.9%	3.7%
420.94	Chloride (salt (in bulk).	3% ad val.	2.6%	2.3%	1.9%	1.5%	1.1%	0.8%	0.4%	Free
421.08	Hydroxide----------	0.2¢/lb	0.15¢/lb	0.15¢/lb	0.1¢/lb	0.1¢/lb	0.05¢/lb	0.05¢/lb	Free	Free

BEST DOCUMENT AVAILABLE

Appendix B

Concordance of TSUS Numbers, Schedule B Numbers, SIC Numbers, SITC Numbers, and CCCN Numbers

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Sodium compounds: TSUS item numbers, Schedule B numbers, SIC numbers, SITC numbers, and CCCN numbers included in this commodity group

Sodium compound	TSUS item No.	Schedule B No.	SIC No.	SITC No.	CCCN No.
Bicarbonate	420.72	420.7200	2912(pt.)	523.24	28.42(pt.)
Carbonate-calcined	420.84	420.8400	2912(pt.)	523.23 (pt.)	28.42(pt.)
Carbonate-hydrated and sesquicarbonate	420.86	421.6200(pt.)	2812(pt.)	523.23 (pt.)	28.42(pt.)
Chloride-brine	420.92	420.9500(pt.)	2899(pt.)	278.3 (pt.)	25.01(pt.)
Chloride-bulk	420.94	420.9500(pt.)	2899(pt.)	278.3 (pt.)	25.01(pt.)
Chloride-other	420.96	420.9500(pt.)	2899(pt.)	278.3 (pt.)	25.01(pt.)
Hydroxide	421.08	421.0830 1/ 421.0850 2/	2812(pt.)	522.53 1/ 522.52 2/	28.17(pt.)

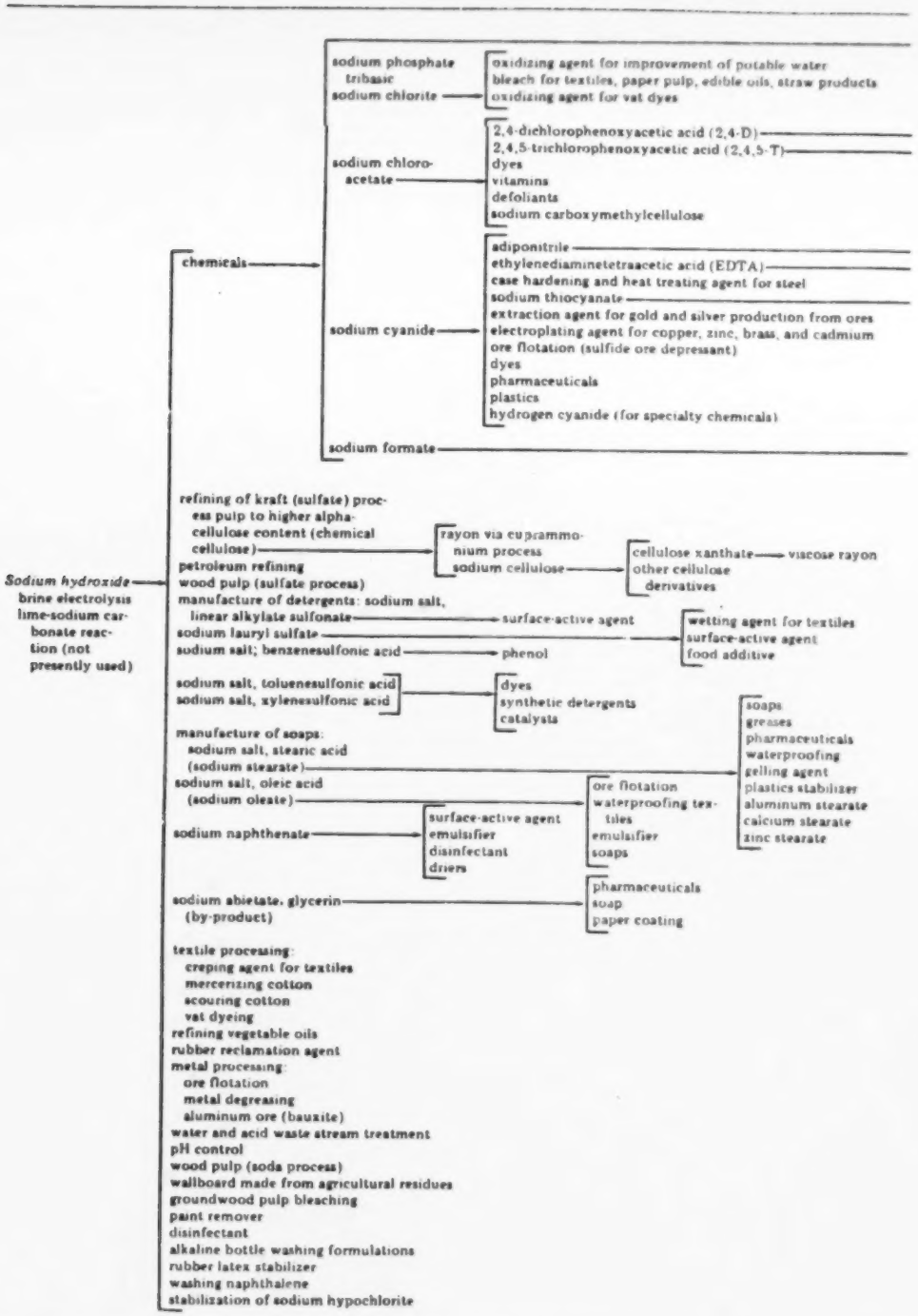
1/ Sodium hydroxide, liquid.
2/ Sodium hydroxide, dry.

Appendix C

Flow Chart of Reaction Products and Uses for Sodium Hydroxide

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE



BEST DOCUMENT AVAILABLE

Source: "Alkali and Chlorine Products," Encyclopedia of Chemical Technology, 1978, vol. 1, pp. 852-853.

BLANK PAGE

Appendix D

Statistical Tables

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Table 1.--Sodium chloride: 1/ Production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-79, January-October 1979, and January-October 1980

(Quantity in thousands of short tons; value in thousands of dollars; unit value in dollars per short ton)

Period	Production	Exports	Imports	Apparent consumption	Ratio (percent) of imports to consumption
	Quantity				
1975	41,710	1,332	3,215	43,593	7.4
1976	43,801	1,007	4,352	47,146	9.2
1977	42,922	1,008	4,529	46,443	9.8
1978	42,878	776	5,514	47,616	11.6
1979	46,317	2,080	5,344	49,581	10.8
Jan.-Oct.--					
1979	2/ 38,600	1,791	4,282	2/ 41,091	2/ 10.4
1980	2/ 39,730	2,279	4,470	2/ 41,921	2/ 10.7
	Value				
1975	2/ 375,000	9,070	15,272	2/ 381,202	2/ 4.0
1976	2/ 430,000	10,325	23,476	2/ 443,151	2/ 5.3
1977	2/ 450,000	10,880	26,694	2/ 465,814	2/ 5.7
1978	2/ 500,000	9,795	34,247	2/ 524,452	2/ 6.5
1979	2/ 550,000	9,489	40,860	2/ 581,371	2/ 7.0
Jan.-Oct.--					
1979	2/ 460,000	7,723	32,792	2/ 485,069	2/ 6.8
1980	3/	10,855	36,794	3/	3/
	Unit value				
1975	$8.99	$6.81	$4.75	-	-
1976	9.82	10.25	5.39	-	-
1977	10.48	10.79	5.89	-	-
1978	11.66	12.62	6.21	-	-
1979	11.87	4.56	7.65	-	-
Jan.-Oct.--					
1979	11.92	4.31	7.66	-	-
1980	3/	4.76	8.23	-	-

1/ Includes sodium chloride in brine, in bulk, and in bags/barrel/and so forth.

2/ Estimated by the staff of the U.S. International Trade Commission.

3/ Not available.

Source: Production, U.S. Bureau of Mines; exports and imports, compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 2.--Sodium hydroxide (liquid and anhydrous): U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-79, January-October 1979, and January-October 1980

(Quantity in thousands of short tons; value in thousands of dollars; unit value in dollars per short ton)

Period	Production	Exports	Imports	Apparent consumption	Ratio (percent) of imports to consumption
	Quantity				
1975	9,640	1,109	108	8,639	1.3
1976	10,520	979	146	9,687	1.5
1977	11,000	1,125	249	10,124	2.5
1978	11,310	1,789	283	9,804	2.9
1979	12,770	1,485	184	11,469	1.6
Jan.-Oct.--					
1979	10,233	1,166	160	9,227	1.7
1980	9,350	1,249	104	8,205	1.3
	Value				
1975	1/ 1,396,400	155,594	15,801	1,256,607	1.3
1976	1/ 1,535,900	100,718	13,210	1,448,392	.9
1977	1/ 1,606,000	113,181	20,777	1,513,596	1.4
1978	1/ 1,678,400	131,985	22,058	1,568,473	1.4
1979	1/ 1,895,100	152,007	17,097	1,760,190	1.0
Jan.-Oct.--					
1979	1/ 1,518,600	116,753	14,955	1,416,802	1.1
1980	1/ 1,944,800	173,038	11,756	1,783,518	.6
	Unit value				
1975	$145	$140	$146	-	-
1976	146	103	90	-	-
1977	146	101	83	-	-
1978	148	74	78	-	-
1979	148	102	93	-	-
Jan.-Oct.--					
1979	148	100	93	-	-
1980	208	139	113	-	-

1/ Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 3.--Sodium carbonate: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-79, January-October 1979, and January-October 1980

(Quantity in thousands of short tons; value in thousands of dollars: unit value in dollars per short ton)

Period	Production	Exports	Imports	Apparent consumption	Ratio (percent) of imports to consumption
			Quantity		
1975	7,130	529	2	6,603	0.03
1976	7,560	645	2/	6,915	-
1977	8,040	759	1	7,282	.01
1978	8,300	779	8	7,529	.11
1979	8,250	997	40	7,293	.55
Jan.-Oct.--					
1979	3/ 6,880	769	35	6,146	.57
1980	3/ 6,920	935	14	5,999	.23
			Value		
1975	4/	45,822	349	4/	4/
1976	259,253	47,004	24	212,273	0.01
1977	357,516	52,943	148	304,721	.05
1978	370,147	61,454	734	309,427	.02
1979	500,000	86,663	4,303	417,640	1.03
Jan.-Oct.--					
1979	3/ 416,670	65,886	3,666	354,450	1.03
1980	3/ 666,670	103,630	1,891	564,931	.33
			Unit value		
1975	$36	$87	$175	-	-
1976	47	73	-	-	-
1977	46	70	148	-	-
1978	45	79	92	-	-
1979	61	87	108	-	-
Jan.-Oct.--					
1979	61	86	105	-	-
1980	96	110	135	-	-

1/ Includes sodium carbonate, calcined and sodium carbonate, hydrated and sesquicarbonate.

2/ Less than 500 short tons.

3/ Estimated by the staff of the U.S. International Trade Commission.

4/ Not available.

Source: Production, U.S. Bureau of Mines; exports and imports, compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 4.--Sodium bicarbonate: U.S. production, exports of domestic merchandise, imports for consumption, and apparent consumption, 1975-79, January-October 1979, and January-October 1980

(Quantity in thousands of short tons; value in thousands of dollars; unit value in dollars per short tons)

Period	Production	Exports	Imports	Apparent consumption	Ratio (percent) of imports to consumption
	Quantity				
1975	1/ 230	3	1	228	0.4
1976	1/ 240	5	2	237	.8
1977	1/ 250	5	4	249	1.6
1978	1/ 260	6	7	261	2.7
1979	1/ 270	18	3	255	1.2
Jan.-Oct.--					
1979	1/ 225	15	2	212	.9
1980	2/	15	2	2/	2/
	Value				
1975	2/	2,470	79	2/	2/
1976	2/	3,078	153	2/	2/
1977	2/	3,153	449	2/	2/
1978	2/	4,053	774	2/	2/
1979	2/	4,932	394	2/	2/
Jan.-Oct.--					
1979	2/	4,052	304	2/	2/
1980	2/	4,510	395	2/	2/
	Unit value				
1975	2/	$740	$120	-	-
1976	2/	680	100	-	-
1977	2/	680	100	-	-
1978	2/	660	120	-	-
1979	2/	280	120	-	-
Jan.-Oct.--					
1979	2/	280	120	-	-
1980	2/	300	180	-	-

1/ Estimated by the staff of the U.S. International Trade Commission.
2/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 5.--Sodium chloride (salt): in brine: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	January-October-- 1980
	Quantity (1,000 pounds)						
Denmark	6	20	6	16	12	12	4
Canada	24	0	0	54	478	384	17,801
Finland	0	0	0	0	1/	1/	0
Sweden	0	0	0	0	0	1/	71
U King	0	0	2	0	1/	1/	0
Nethlds	22	0	0	105	0	0	0
Chile	0	0	0	1	0	0	0
Bahamas	0	0	71,740	0	0	0	0
All other	0	22	0	0	0	0	105
Total	52	42	71,748	176	491	396	17,981
	Value (1,000 dollars)						
Denmark	2	11	4	71	43	37	20
Canada	2/	-	-	1	5	4	33
Finland	-	-	-	-	1	1	-
Sweden	-	-	-	-	1	1	1
U King	-	-	1	-	2/	2/	-
Nethlds	1	-	-	1	-	-	-
Chile	-	-	-	2/	-	-	-
Bahamas	-	-	182	-	-	-	-
All other	-	1	-	-	-	-	3
Total	3	12	187	73	51	43	56
	Unit value (per 100 pounds)						
Denmark	$37.45	$54.14	$61.58	$440.73	$350.08	$306.93	$468.74
Canada	1.85	-	-	1.11	1.12	.92	.18
Finland	-	-	-	-	316.33	316.33	-
Sweden	-	-	-	-	-	-	1.02
U King	-	-	48.15	-	344.00	344.00	-
Nethlds	3.27	-	-	1.05	-	-	-
Chile	-	-	-	20.00	-	-	-
Bahamas	-	-	.25	-	-	-	-
All other	-	2.32	-	-	-	-	2.46
Average	6.57	27.52	.26	41.41	10.33	10.83	.31

1/ Less than 500 pounds.
2/ Less than $500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Table 6.--Sodium chloride (salt): in bulk: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	January-October-- 1980
	Quantity (1,000 pounds)						
Canada	1,726,082	3,271,068	2,919,064	4,006,742	4,113,754	3,422,547	3,424,797
Mexico	2,083,332	1,372,618	2,525,598	3,199,292	3,298,017	2,694,762	2,433,366
Bahamas	2,281,776	2,792,890	2,633,256	1,397,275	1,055,048	853,976	912,337
Spain	0	504,652	550,000	975,532	503,360	398,486	197,499
Chile	57,098	292,584	95,332	406,084	488,064	227,767	561,094
Brazil	0	0	0	0	394,361	342,906	123,210
N Antil	245,312	302,372	217,490	501,155	350,550	323,659	266,672
Italy	0	0	0	71,629	83,445	83,445	0
All other	16,844	130,036	220	200,115	262,227	159,223	957,236
Total	6,410,444	8,666,218	8,940,960	10,757,824	10,548,826	8,506,771	8,876,211
	Value (1,000 dollars)						
Canada	4,309	9,495	8,616	12,255	14,369	11,697	12,467
Mexico	4,554	4,139	7,605	10,180	11,266	9,372	8,430
Bahamas	5,054	6,295	6,896	3,219	3,842	3,136	4,943
Spain	-	1,135	1,538	2,877	1,745	1,316	827
Chile	139	667	213	1,397	1,699	727	1,975
Brazil	-	-	-	-	1,625	1,413	608
N Antil	596	802	747	2,076	1,597	1,483	1,277
Italy	-	-	-	346	1,205	1,205	-
All other	37	242	10	615	1,701	1,042	4,910
Total	14,689	22,774	25,624	32,965	39,049	31,391	35,438
	Unit value (per 100 pounds)						
Canada	$0.25	$0.29	$0.30	¢0.31	¢0.35	¢0.34	¢0.36
Mexico	.27	.30	.30	0.32	0.34	0.35	0.35
Bahamas	.22	.23	.26	0.23	0.36	0.37	0.54
Spain	-	.22	.28	0.29	0.35	0.33	0.42
Chile	.24	.23	.22	0.34	0.35	0.32	0.35
Brazil	-	-	-	-	0.41	0.41	0.49
N Antil	.24	.27	.34	0.41	0.46	0.46	0.48
Italy	-	-	-	0.48	1.44	1.44	-
All other	.22	.19	4.55	0.31	0.65	0.65	0.51
Average	.23	.26	.29	0.31	0.37	0.37	0.40

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 7.--Sodium chloride (salt): other: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	January-October-- 1980
	Quantity (1,000 pounds)						
Canada	20,114	35,532	44,703	255,202	58,004	45,774	42,089
Japan	0	3	7	2,690	4,299	4,299	3,785
Bahamas	0	0	0	0	69,260	0	0
France	236	620	105	4,924	2,070	1,980	2,755
Denmark	2	0	1/	207	10	10	13,233
FR Germ	418	993	680	4,965	102	92	57
Mexico	0	0	0	33	4,860	4,860	206
U King	21	5	19	591	2	9	1,137
All other	91	26	46	486	101	50	652
Total	20,883	37,180	45,560	269,098	138,708	57,074	63,914
	Value (1,000 dollars)						
Canada	404	485	678	886	1,206	966	893
Japan	-	1	1	166	280	280	269
Bahamas	-	-	-	-	143	-	-
France	35	28	33	55	55	41	56
Denmark	1	-	1	3	29	28	21
FR Germ	119	143	152	61	21	20	15
Mexico	-	-	-	2/	17	17	4
U King	1	2	11	9	5	4	13
All other	19	32	7	29	4	2	29
Total	580	691	883	1,209	1,760	1,358	1,300
	Unit value (per 100 pounds)						
Canada	$ 2.01	$ 1.37	$ 1.51	$0.35	$2.08	$2.11	$2.12
Japan	-	21.08	20.14	6.18	6.52	6.52	7.10
Bahamas	-	-	-	-	0.21	-	-
France	14.88	4.54	31.71	1.12	2.68	2.08	2.03
Denmark	86.92	-	436.84	1.41	283.50	281.73	0.16
FR Germ	28.53	14.44	22.35	1.23	20.66	21.55	26.64
Mexico	-	-	-	1.30	0.34	0.34	1.78
U King	6.30	39.30	56.67	1.54	48.78	45.30	1.15
All other	20.54	122.71	13.76	5.93	4.58	4.83	4.51
Average	2.78	1.86	1.94	0.45	1.27	2.38	2.03

1/ Less than 500 pounds.
2/ Less than $500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 8.--Sodium hydroxide: liquid and anhydrous: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	1980
	Quantity (1,000 pounds)						
Canada	79,531	131,420	160,955	114,710	136,763	113,375	158,660
FR Germ	54,111	87,236	114,663	245,557	137,939	122,342	17,758
Belgium	40,271	2,121	24,455	60,612	41,742	32,838	13,512
U King	0	1/	21,145	11,931	16,655	16,655	11,461
France	14,436	67,337	40,903	51,708	19,960	19,960	4,343
Sweden	1,858	1,352	2,398	1,548	2,086	2,004	1,441
Nethlds	288	0	42,171	52,699	10,595	10,595	294
Poland	0	0	4	939	1,028	1,028	0
All other	25,043	2,351	90,928	25,927	362	351	33
Total	215,537	292,318	497,624	565,632	367,130	319,150	207,501
	Value (1,000 dollars)						
Canada	4,620	7,729	9,319	7,522	8,176	6,943	8,324
FR Germ	2,382	2,524	3,434	6,597	4,513	3,968	1,405
Belgium	2,553	86	689	2,244	1,711	1,375	661
U King	-	2/	820	450	905	905	747
France	3,061	2,367	1,606	1,831	784	784	167
Sweden	359	396	627	428	573	550	404
Nethlds	11	-	1,420	2,095	341	341	36
Poland	-	-	2/	62	59	59	-
All other	2,814	108	2,813	829	34	31	12
Total	15,801	13,210	20,777	22,058	17,097	14,955	11,756
	Unit value (per pound)						
Canada	$0.06	$0.06	$0.06	$0.07	$0.06	$0.06	$0.05
FR Germ	0.04	0.03	0.03	0.03	0.03	0.03	0.08
Belgium	0.06	0.04	0.03	0.04	0.04	0.04	0.05
U King	-	11.88	0.04	0.04	0.05	0.05	0.07
France	0.21	0.03	0.04	0.04	0.04	0.04	0.04
Sweden	0.19	0.21	0.26	0.28	0.27	0.27	0.28
Nethlds	0.04	-	0.03	0.04	0.03	0.03	0.12
Poland	-	-	0.11	0.07	0.06	0.06	-
All other	0.11	0.05	0.03	0.03	0.09	0.09	0.36
Average	0.07	0.05	0.04	0.04	0.05	0.05	0.06

1/ Less than 500 pounds.
2/ Less than $500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 9.--Sodium carbonate: calcined (soda ash): U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	January-October-- 1980
	Quantity (1,000 pounds)						
Canada	220	26	2,792	15,527	78,087	66,820	28,839
FR Germ	0	0	0	1/	1,136	1,136	0
Romania	2,206	0	0	0	1,177	1,177	0
U King	90	0	0	0	106	106	1
Japan	0	0	0	0	10	10	0
Belgium	0	0	1/	0	0	0	0
Sweden	0	0	0	0	0	0	1/
France	2,377	0	0	0	0	0	0
All other	0	0	0	0	0	0	1
Total	4,893	26	2,792	15,527	80,516	69,250	28,841
	Value (1,000 dollars)						
Canada	30	2	145	723	4,167	3,532	1,877
FR Germ	-	-	-	2/	80	80	-
Romania	187	-	-	-	41	41	-
U King	13	-	-	-	4	4	3
Japan	-	-	-	-	1	1	-
Belgium	-	-	1	-	-	-	-
Sweden	-	-	-	-	-	-	2/
France	110	-	-	-	-	-	-
All other	-	-	-	-	-	-	2/
Total	341	2	145	723	4,292	3,657	1,881
	Unit value (per pound)						
Canada	$0.14	$0.09	$0.05	$0.05	$0.05	$0.05	$0.07
FR Germ	-	-	-	0.88	0.07	0.07	-
Romania	0.08	-	-	-	0.03	0.03	-
U King	0.15	-	-	-	0.04	0.04	3.20
Japan	-	-	-	-	0.08	0.08	-
Belgium	-	-	1.45	-	-	-	-
Sweden	-	-	-	-	-	-	6.95
France	0.05	-	-	-	-	-	-
All other	-	-	-	-	-	-	0.48
Average	0.07	0.09	0.05	0.05	0.05	0.05	0.07

1/ Less than 500 pounds.
2/ Less than $500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 10.--Sodium carbonate: hydrated and sesquicarbonate: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	January-October-- 1980
	Quantity (1,000 pounds)						
U King	1	2	2	3	106	71	1
Japan	0	0	0	4	6	6	15
Hg Kong	0	0	0	0	1	0	0
FR Germ	1/	2	1/	2	0	0	1/
Canada	0	35	0	0	0	0	0
Norway	6	0	0	0	0	0	0
France	1/	0	0	0	0	0	0
Total	8	40	2	9	112	76	16
	Value (1,000 dollars)						
U King	3	2	1	4	8	6	1
Japan	-	-	-	3	3	3	7
Hg Kong	-	-	-	-	2/	-	-
FR Germ	2	4	1	4	-	-	1
Canada	-	17	-	-	-	-	-
Norway	2	-	-	-	-	-	-
France	1	-	-	-	-	-	-
Total	8	22	3	11	11	9	10
	Unit value (per pound)						
U King	$2.19	$0.66	$0.79	$1.53	$0.07	$0.09	$0.96
Japan	-	-	-	0.73	0.53	0.53	0.50
Hg Kong	-	-	-	-	0.40	-	-
FR Germ	36.18	1.50	5.15	2.21	-	-	38.73
Canada	-	0.47	-	-	-	-	-
Norway	0.29	-	-	-	-	-	-
France	2.73	-	-	-	-	-	-
Average	0.96	0.54	1.27	1.26	0.10	0.12	0.61

1/ Less than 500 pounds.
2/ Less than $500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 11.--Sodium bicarbonate: U.S. imports for consumption, by principal sources, 1975-79 and January-October 1979, and January-October 1980

Source	1975	1976	1977	1978	1979	January-October-- 1979	1980
	Quantity (1,000 pounds)						
U King	1,300	2,998	6,910	11,717	4,870	3,466	3,823
Mexico	0	88	1,419	2,098	1,376	1,332	536
Canada	0	0	7	0	18	13	10
Norway	4	1/	1	1/	5	4	0
India	0	0	0	0	2	1	3
Japan	0	0	1	0	1	1	0
Yugoslv	0	0	0	0	1	0	0
France	0	11	1/	1/	0	0	28
All other	2	1	2	0	0	0	5
Total	1,306	3,098	8,339	13,815	6,273	4,817	4,404
	Value (1,000 dollars)						
U King	72	144	344	612	279	199	276
Mexico	-	7	98	161	102	97	54
Canada	-	-	1	-	7	5	5
Norway	3	2/	1	2/	4	1	-
India	-	-	-	-	1	1	2
Japan	-	-	1	-	1	1	-
Yugoslv	-	-	-	-	2/	-	-
France	-	1	2/	2/	-	-	56
All other	3	1	5	-	-	-	1
Total	79	153	449	774	394	304	395
	Unit value (per pound)						
U King	$0.06	$0.05	$0.05	$0.05	$0.06	$0.06	$0.07
Mexico	-	0.08	0.07	0.08	0.07	0.07	0.10
Canada	-	-	0.12	-	0.39	0.37	0.54
Norway	0.91	1.98	1.20	8.78	0.80	0.36	-
India	-	-	-	-	0.60	0.69	0.84
Japan	-	-	0.74	-	1.02	1.02	-
Yugoslv	-	-	-	-	0.68	-	-
France	-	0.07	0.67	5.04	-	-	2.04
All other	1.47	1.21	2.28	-	-	-	0.27
Average	0.06	0.05	0.05	0.06	0.06	0.06	0.09

1/ Less than 500 pounds.
2/ Less than $500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 12.--Sodium chloride (salt): in brine: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980

Market	1975	1976	1977	1978	1979	January-October-- 1979	1980
	Quantity (1,000 pounds)						
Canada	2,629,422	1,914,964	1,924,816	1,499,628	3,253,796	2,685,104	3,766,778
S Arab	2,084	9,162	5,190	12,878	6,702	5,820	12,700
Mexico	5,784	23,064	47,008	11,362	874,518	871,018	742,272
Bahamas	3,520	3,474	3,564	2,560	1,928	1,724	1,848
Trinid	3,726	318	56	72	3,262	2,042	4,160
U King	160	40,076	526	694	1,740	1,526	1,112
Angola	0	0	0	518	2,060	2,060	0
Arab Em	1,488	6,912	5,768	106	1,006	1,028	1,054
All other	17,604	15,462	28,868	24,668	14,226	11,590	27,882
Total	2,663,788	2,013,432	2,015,796	1,552,486	4,159,318	3,581,912	4,557,806
	Value (1,000 dollars)						
Canada	7,585	7,917	8,373	6,776	7,218	5,817	7,623
S Arab	206	863	456	1,377	835	724	1,206
Mexico	190	287	311	298	287	247	270
Bahamas	117	137	133	120	121	108	143
Trinid	177	17	6	26	119	67	162
U King	63	72	70	111	78	53	77
Angola	-	-	-	18	78	78	-
Arab Em	102	280	216	27	72	65	93
All other	631	752	1,316	1,042	681	565	1,280
Total	9,070	10,325	10,880	9,795	9,489	7,723	10,855
	Unit value (per pound)						
Canada	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
S Arab	0.10	0.09	0.09	0.11	0.12	0.12	0.09
Mexico	0.03	0.01	0.01	0.03	0.00	0.00	0.00
Bahamas	0.03	0.04	0.04	0.05	0.06	0.06	0.08
Trinid	0.05	0.05	0.10	0.37	0.04	0.03	0.04
U King	0.39	0.00	0.13	0.16	0.04	0.03	0.07
Angola	-	-	-	0.03	0.04	0.04	-
Arab Em	0.07	0.04	0.04	0.26	0.07	0.06	0.09
All other	0.04	0.05	0.05	0.04	0.05	0.05	0.05
Average	0.00	0.01	0.01	0.01	0.00	0.00	0.00

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 13.--Sodium hydroxide: liquid: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980

Market	1975	1976	1977	1978	1979	January-October-- 1979	1980
	Quantity (1,000 pounds)						
Austral	417,466	469,771	631,180	893,279	665,924	481,056	515,110
Canada	360,274	252,130	406,670	933,863	507,495	423,350	329,908
Jamaica	446,024	285,793	435,029	637,693	442,656	337,945	454,364
Surinam	268,184	247,051	262,550	373,611	263,204	209,273	262,309
Mexico	72,289	95,135	62,663	176,611	306,640	245,428	317,658
Colomb	2,829	334	5,047	57,007	67,149	48,591	88,004
Kor Rep	3	3,347	4	3	50,440	39,179	24,262
Guyana	97,626	67,379	78,312	114,029	49,661	43,895	65,991
All other	298,918	345,040	292,109	228,896	315,617	261,921	235,949
Total	1,963,612	1,765,979	2,173,564	3,414,992	2,668,788	2,090,638	2,293,553
	Value (1,000 dollars)						
Austral	23,300	27,149	30,362	31,474	30,219	19,901	25,753
Canada	18,259	12,129	20,053	32,965	25,721	21,319	23,160
Jamaica	20,044	13,957	20,448	20,638	19,250	14,991	22,849
Surinam	12,873	10,888	15,009	15,589	15,146	12,253	14,280
Mexico	7,349	4,343	2,494	6,989	11,853	9,537	26,250
Colomb	384	52	167	1,523	3,688	3,075	4,977
Kor Rep	3	151	5	2	3,207	2,524	2,439
Guyana	4,490	3,711	3,771	3,531	2,431	2,190	3,314
All other	29,506	15,274	14,953	8,950	14,530	11,496	20,512
Total	116,209	87,654	107,262	121,662	126,045	97,287	143,532
	Unit value (per pound)						
Austral	$0.06	$0.06	$0.05	$0.04	$0.05	$0.04	$0.05
Canada	0.05	0.05	0.05	0.04	0.05	0.05	0.07
Jamaica	0.04	0.05	0.05	0.03	0.04	0.04	0.05
Surinam	0.05	0.04	0.06	0.04	0.06	0.06	0.05
Mexico	0.10	0.05	0.04	0.04	0.04	0.04	0.08
Colomb	0.14	0.16	0.03	0.03	0.05	0.06	0.06
Kor Rep	1.03	0.05	1.04	0.76	0.06	0.06	0.10
Guyana	0.05	0.06	0.05	0.03	0.05	0.05	0.05
All other	0.10	0.04	0.05	0.04	0.05	0.04	0.09
Average	0.06	0.05	0.05	0.04	0.05	0.05	0.06

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 14.--Sodium hydroxide: anhydrous: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980

Market	1975	1976	1977	1978	1979	January-October-- 1979	January-October-- 1980
	Quantity (1,000 pounds)						
China P.	0	0	0	11,024	64,039	54,118	61,587
Indnsia	4,555	10,343	0	11,053	45,958	44,550	17,761
USSR	33,079	0	0	0	22,269	1	1/
Colomb	2,192	0	9,397	8,897	26,614	25,285	4,734
Phil R	1,067	0	1,447	1,123	16,164	12,823	3,743
Kor Rep	0	946	0	48	14,351	13,605	3,248
Canada	3,681	4,101	9,018	8,946	12,151	9,555	12,459
Singapr	2,224	2,786	0	2,269	13,372	8,927	2,342
All other	207,810	174,525	56,580	119,299	86,131	72,876	99,437
Total	254,608	192,701	76,442	162,658	301,048	241,740	205,313
	Value (1,000 dollars)						
China P.	-	-	-	531	4,439	3,337	9,378
Indnsia	714	605	-	520	3,464	3,288	2,353
USSR	4,799	-	-	-	1,934	1	46
Colomb	478	-	458	438	1,540	1,352	781
Phil R	169	-	148	62	1,312	938	540
Kor Rep	-	72	-	4	1,087	978	532
Canada	260	291	703	577	1,051	759	1,241
Singapr	318	140	-	103	1,045	707	200
All other	32,647	11,956	4,610	8,089	10,090	8,106	14,437
Total	39,385	13,064	5,919	10,323	25,962	19,466	29,506
	Unit value (per pound)						
China P.	-	-	-	$0.05	$0.07	$0.06	$0.15
Indnsia	$0.16	$0.06	-	0.05	0.08	0.07	0.13
USSR	.15	-	-	-	0.09	1.47	5,075.89
Colomb	.22	-	$0.05	0.05	0.06	0.05	0.16
Phil R	.16	-	.10	0.05	0.08	0.07	0.14
Kor Rep	-	.08	-	0.09	0.08	0.07	0.16
Canada	.07	.07	.08	0.06	0.09	0.08	0.10
Singapr	.14	.05	-	0.05	0.08	0.08	0.09
All other	.16	.07	.08	0.07	0.12	0.11	0.15
Average	.15	.07	.08	0.06	0.09	0.08	0.14

1/ Less than 500 pounds.

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table15.--Sodium carbonate: calcined (soda ash): U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980

Market	1975	1976	1977	1978	1979	January-October-- 1979	1980
	Quantity (1,000 pounds)						
Mexico	153,992	47,089	216,048	211,558	315,975	273,011	312,192
Canada	257,940	368,061	376,905	385,710	386,546	328,692	270,574
Rep Saf	57,769	142,283	143,678	168,819	222,075	172,756	232,610
Venez	115,450	152,718	175,699	161,248	196,621	159,063	211,987
Brazil	9,456	4,480	66,562	128,856	148,703	70,211	228,566
Japan	112,810	154,159	156,075	95,430	155,989	125,219	126,597
Argent	192,477	154,259	99,864	37,018	88,021	88,007	21,117
India	C	0	0	0	40,808	7,763	24,327
All other	158,702	267,309	283,856	369,109	439,629	312,576	442,047
Total	1,058,596	1,290,358	1,518,687	1,557,747	1,994,367	1,537,299	1,870,017
	Value (1,000 dollars)						
Mexico	7,009	2,229	8,849	8,737	14,851	12,703	17,928
Canada	5,610	9,942	10,871	11,505	13,099	11,070	11,325
Rep Saf	3,565	6,863	5,346	6,707	9,979	7,581	13,423
Venez	5,949	6,774	6,276	12,513	9,161	7,285	10,875
Brazil	639	158	2,310	3,771	5,948	2,370	12,020
Japan	2,773	4,530	5,272	3,365	5,846	4,785	6,517
Argent	10,339	6,033	3,658	1,324	4,625	4,623	1,399
India	-	-	-	-	3,503	454	2,227
All other	9,938	10,473	10,361	13,530	19,652	15,016	27,916
Total	45,822	47,004	52,943	61,454	86,663	65,886	103,630
	Unit value (per pound)						
Mexico	$0.05	$0.05	$0.04	$0.04	$0.05	$0.05	$0.06
Canada	0.02	0.03	0.03	0.03	0.03	0.03	0.04
Rep Saf	0.06	0.05	0.04	0.04	0.04	0.04	0.06
Venez	0.05	0.04	0.04	0.08	0.05	0.05	0.05
Brazil	0.07	0.04	0.03	0.03	0.04	0.03	0.05
Japan	0.02	0.03	0.03	0.04	0.04	0.04	0.05
Argent	0.05	0.04	0.04	0.04	0.05	0.05	0.07
India	-	-	-	-	0.09	0.06	0.09
All other	0.06	0.04	0.04	0.04	0.04	0.05	0.06
Average	0.04	0.04	0.03	0.04	0.04	0.04	0.06

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

Table 16.--Sodium bicarbonate: U.S. exports of domestic merchandise, by principal markets, 1975-79 and January-October 1979, and January-October 1980

Market	1975	1976	1977	1978	1979	January-October-- 1979	1980
	Quantity (1,000 pounds)						
Canada	3,747	5,053	5,460	6,745	23,397	19,046	21,873
Brazil	122	721	1,445	2,754	7,309	5,825	3,696
Venez	167	678	623	1,107	2,072	1,720	2,041
U King	5	24	43	187	458	381	101
China P	0	0	0	0	370	370	0
Mexico	1,081	546	257	181	562	466	302
S Arab	5	3	88	8	229	228	46
Guatmal	115	65	81	86	346	346	150
All other	1,443	2,016	1,242	1,291	1,642	1,035	1,722
Total	6,684	9,106	9,239	12,361	36,384	29,416	29,931
	Value (1,000 dollars)						
Canada	1,508	1,990	2,184	2,721	2,990	2,478	3,040
Brazil	10	81	181	290	730	580	400
Venez	20	120	179	392	309	259	445
U King	2	11	26	103	161	135	48
China P	-	-	-	-	127	127	-
Mexico	437	230	102	75	89	72	52
S Arab	2	1	38	4	83	80	16
Guatmal	11	5	23	20	43	43	27
All other	481	640	420	447	400	277	481
Total	2,470	3,078	3,153	4,053	4,932	4,052	4,510
	Unit value (per pound)						
Canada	$0.40	$0.39	$0.40	$0.40	$0.13	$0.13	$0.14
Brazil	0.09	0.11	0.13	0.11	0.10	0.10	0.11
Venez	0.12	0.18	0.29	0.35	0.15	0.15	0.22
U King	0.32	0.46	0.60	0.55	0.35	0.35	0.47
China P	-	-	-	-	0.34	0.34	-
Mexico	0.40	0.42	0.40	0.41	0.16	0.15	0.17
S Arab	0.44	0.42	0.43	0.49	0.36	0.35	0.36
Guatmal	0.09	0.07	0.28	0.23	0.13	0.13	0.18
All other	0.33	0.32	0.34	0.35	0.24	0.27	0.28
Average	0.37	0.34	0.34	0.33	0.14	0.14	0.15

Source: Compiled from official statistics of the U.S. Department of Commerce.

BEST DOCUMENT AVAILABLE

SUMMARIES OF TRADE AND TARIFF INFORMATION

USITC PUBLICATION 841

COMPLETE LIST OF SUMMARIES PUBLISHED TO DATE IN SCHEDULE 4

Control No.	Publication date	Title
4-1,4-1	Oct. 1977	Synthetic Plastics Materials
4-4-2	July 1978	Synthetic Elastomers
4-2-3	Feb. 1981	Uranium and Uranium Compounds
4-1,2-4	Apr. 1981	Pesticides
4-9-5	Apr. 1981	Titanium Dioxide Pigments

BEST DOCUMENT AVAILABLE